MUSHROOM DIGEST

Volume 2: AUGUST 2024

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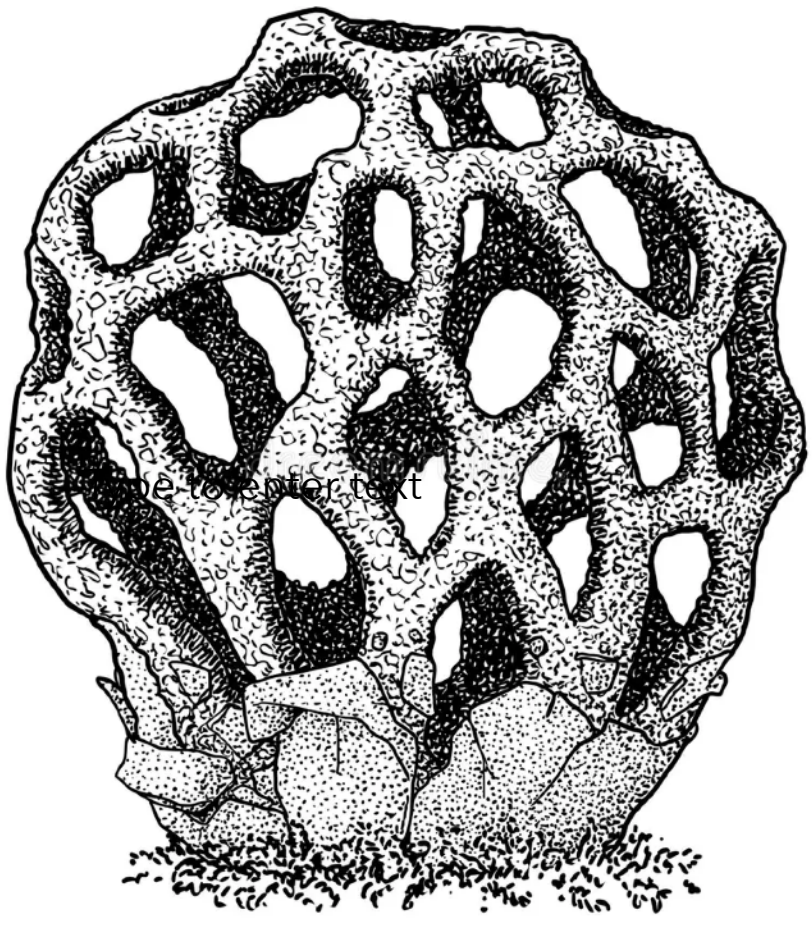

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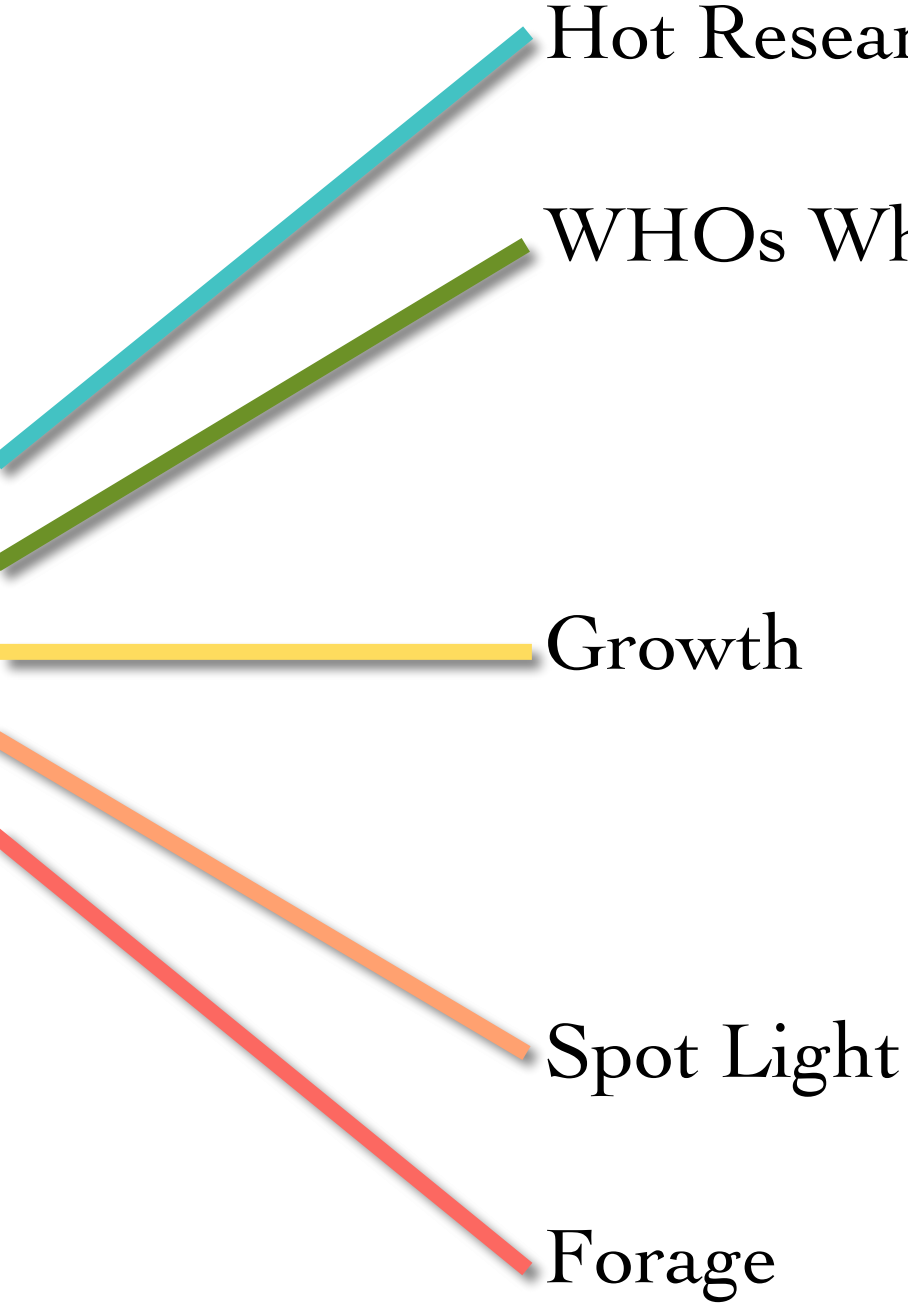
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Cover Image: Credit & photography by Mind Spirit Contact

A Letter from the Editor in Chief at Basidium Equilibrium

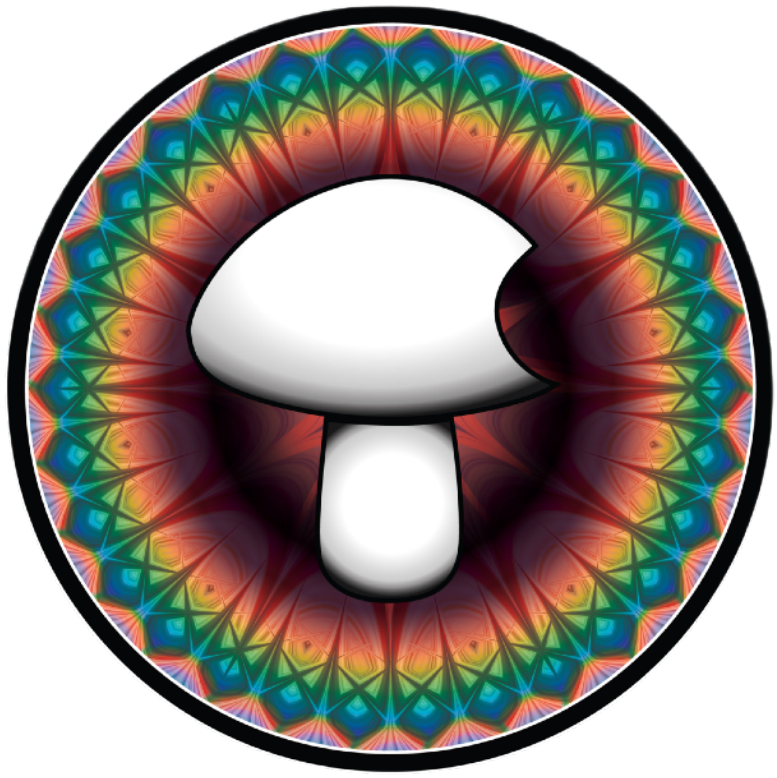
Welcome to this month's edition of our magazine, where we delve deep into the mystical world of fungi. As your editor in chief, I am thrilled to bring together a community of passionate mycologists, foragers, and fungi enthusiasts. Each story, photograph, and piece of research curated in our pages aims to enlighten and inspire.

This issue is particularly special as we explore groundbreaking research and personal adventures in mycology that highlight the intricate relationships within ecosystems and our own lives. We also introduce some exciting new sections that I hope will encourage you to interact with, and contribute to, our growing community.

Thank you for joining us on this fascinating journey. Your curiosity and enthusiasm make this exploration of mycology richer and more rewarding. Here’s to discovering together the profound impact and beauty of fungi.

Warm regards,

Editor in Chief, Basidium Equilibrium



Hot Research

Hot Research

Written by: Basidium Equilibrium

Exploring the Hidden World: How MycoCosm is Revolutionizing Fungal Genomics

In the quest to unlock the secrets of the natural world, fungi present a fascinating puzzle. These organisms are crucial to our planet's ecology, biotechnology, and even medical fields. To advance our understanding of these enigmatic beings, the Joint Genome Institute (JGI) of the Department of Energy has launched MycoCosm, a state-of-the-art web portal dedicated to fungal genomics.

Diving into the Genomic Universe of Fungi

MycoCosm isn’t just a database; it’s a gateway to the microscopic world of fungi, offering tools and resources that enable scientists and enthusiasts to delve deep into fungal DNA. The portal facilitates access to genomic data, comparative analysis, and community-driven annotation, making it an invaluable resource for both seasoned researchers and curious newcomers.

The platform's integration with other JGI resources, like PhycoCosm and IMG/M, creates a comprehensive network for studying not only fungal but also algal and microbial genomics. This interconnectedness highlights the ecosystemic nature of genomic research, where understanding one organism can illuminate the roles of others.

Why Fungal Genomics?

Fungi are more than just mushrooms. They are biofactories capable of producing pharmaceuticals and enzymes, decomposers essential to our ecosystems, and pathogens that can both harm and benefit their hosts. By mapping the genomes of these versatile organisms, MycoCosm helps scientists to:

- Investigate fungal diversity, revealing new species and their unique adaptations.
- Harness fungi for biotechnological applications, such as biofuel production.
- Develop strategies to protect crops against fungal diseases, bolstering food security.

The 1000 Fungal Genomes Project: A Call to Action

One of the flagship initiatives supported by MycoCosm is the 1000 Fungal Genomes Project. This ambitious effort seeks to sequence the genomes of fungi from diverse phylogenetic backgrounds, providing a panoramic view of fungal genomics. The data generated could lead to breakthroughs in multiple fields—from environmental science to medicine.

Get Involved: A Community Effort

MycoCosm is not just for professional scientists. It invites participation from anyone interested in the natural world. Whether you're a student looking to start a project, a citizen scientist eager to contribute to real research, or a professional in biotechnology, MycoCosm offers a way to engage with cutting-edge science.

By participating, you can help annotate genomes, compare genetic data, and even nominate fungi for sequencing. Each contribution enhances our collective understanding and adds another piece to the puzzle of Earth's biodiversity.

Conclusion

MycoCosm represents a significant leap forward in our ability to study and understand fungi at the genetic level. As this field of research grows, the potential for new discoveries and innovations grows with it. If you're fascinated by the potential of DNA sequencing and fungal biology, MycoCosm is your portal to being at the forefront of scientific discovery.

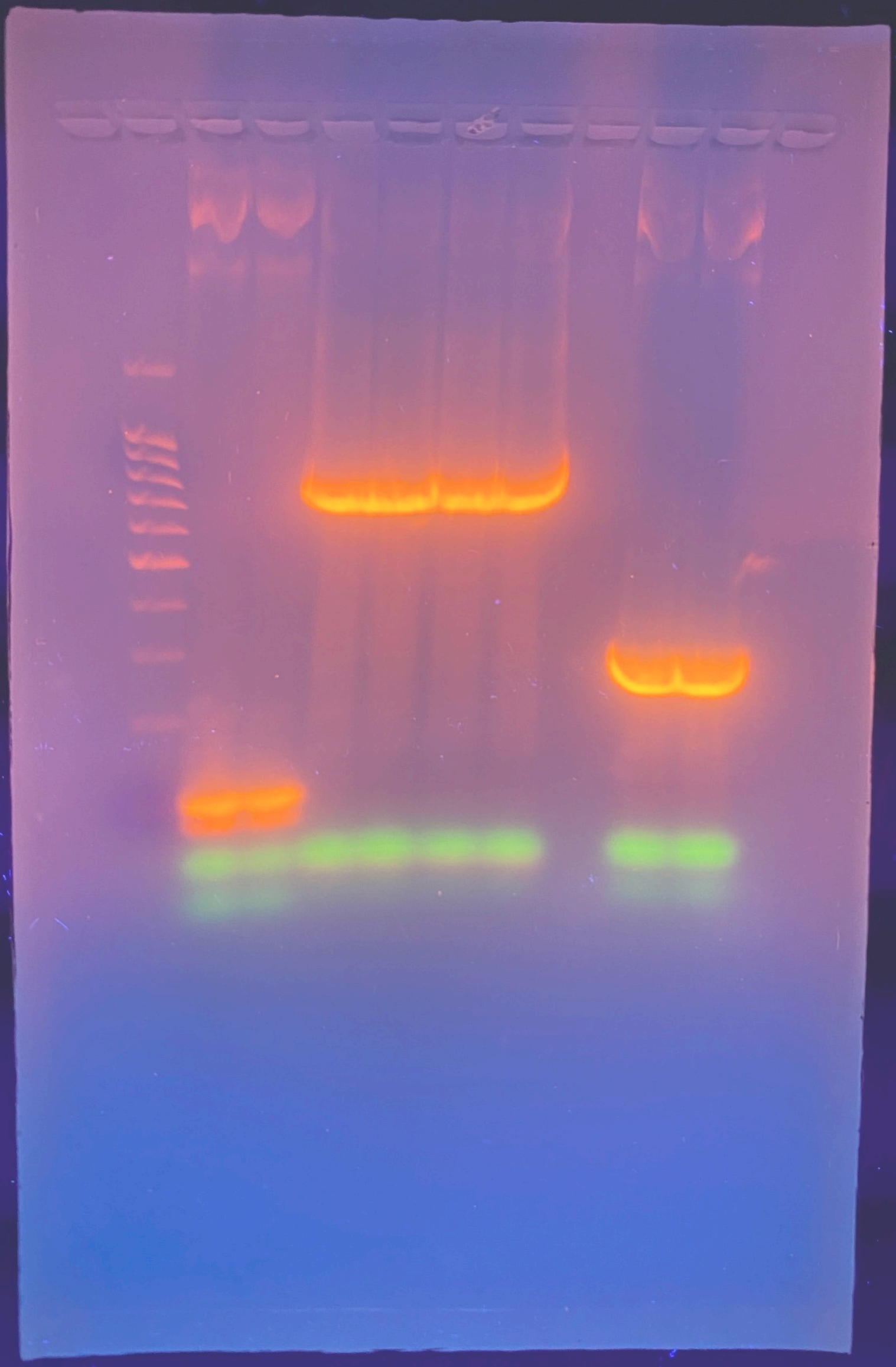
For those interested in exploring fungal genomics or contributing to this vibrant field, visit the MycoCosm portal and join a global community of researchers and enthusiasts at MycoCosm. This is not just research; it's an adventure into the fabric of life itself. Let's explore it together!

To find out more information you can visit MycoCosm at

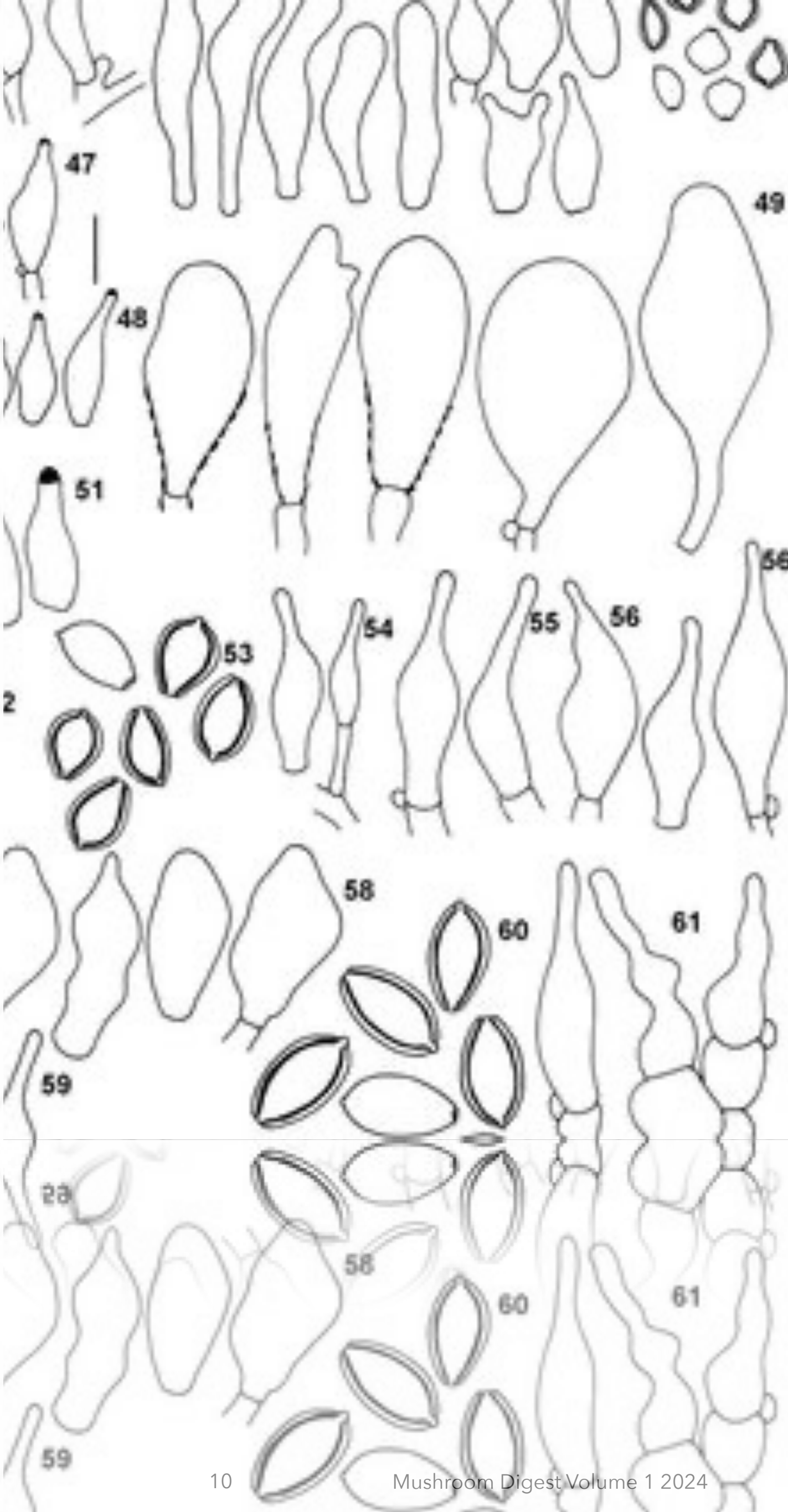
https://mycocosm.jgi.doe.gov/

Cite: The Genome Portal of the Department of Energy Joint Genome Institute

- *The Genome Portal of the Department of Energy Joint Genome Institute*
  Grigoriev IV, Nordberg H, Shabalov I, Aerts A, Cantor M, Goodstein D, Kuo A, Minovitsky S, Nikitin R, Ohm RA, Otillar R, Poliakov A, Ratnere I, Riley R, Smirnova T, Rokhsar D, Dubchak I.
  Nucleic Acids Res. *2012 Jan;40(Database issue):D26-32.*



Who's Who



Gaston Guzman

Mycologist & Anthropologist

Written by Basidium Equilibrium

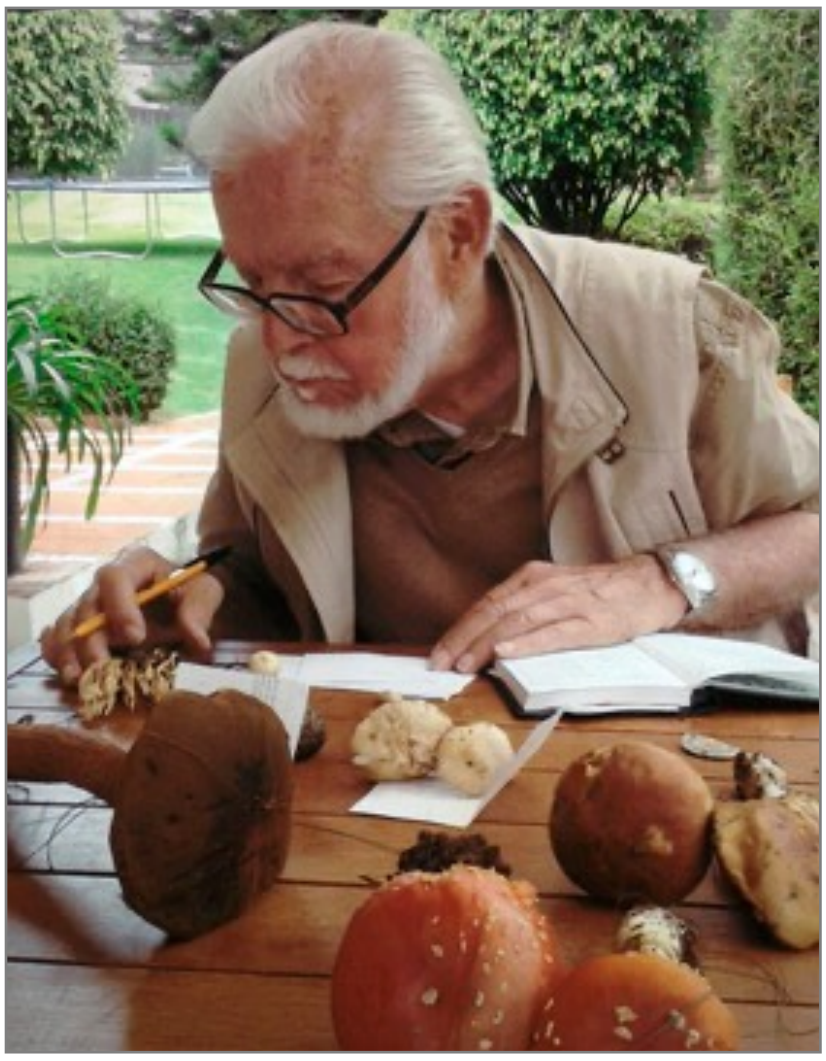
Meet Gaston Guzman, a mycological hero whose seminal works paved the way for future fungi experts and enthusiasts. Born in 1932 in Xalapa, Veracruz, Guzman embarked on his mycological journey during his graduate studies in 1955 by revitalizing the neglected fungal collection at the National Polytechnic Institute. This project ignited his passion for fungi, leading to a professional thesis dedicated to mycological research.

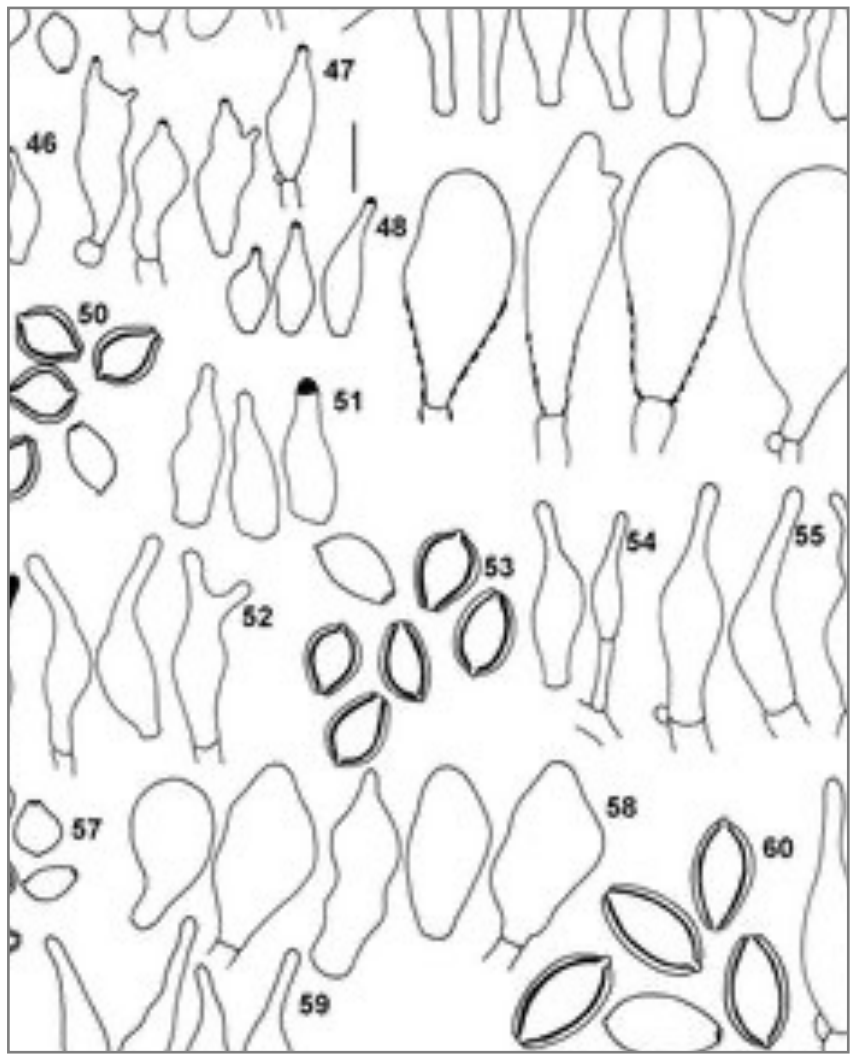
Figure 1) Mycologist Gastón Guzmán in Rancho El Cura in Huautla de Jiménez, Oaxaca in July 2013. Photo by Eduardo Fanti.

In 1957, Guzman's career took a significant turn when he joined Rolf Singer at the University of Mexico to study the hallucinogenic mushrooms of the *Psilocybe* genus. This collaboration was notably enriched by a chance meeting with R. Gordon Wasson during their fieldwork in Huautla de Jiménez, described by Guzman as "fruitful."

Guzman's academic contributions began with his first paper in 1958 on a blue-staining *Psilocybe* species and expanded with his pioneering study on the ecology

of neurotropic fungi. His expertise was recognized in 1971 when he received a grant from the Guggenheim Foundation, recommended by Richard Evans Schultes. This support led to his seminal work, the comprehensive 1983 monograph *The Genus Psilocybe: A Systematic Revision of the Known Species*, which details the history, distribution, and chemistry of the hallucinogenic species.





Throughout his career, Guzman authored eight books and over 350 papers, greatly enhancing the scientific community's understanding of Mexican mushrooms. He described more than 200 new taxa of fungi worldwide, with over half of the known psilocybin mushroom species first described by him and his team.

Beyond his research, Guzman played a crucial role in mycological societies. He co-founded and served as the first president of the Mexican Mycological Society in 1965 and was president of the Latin American Mycological Association from 2000 to 2002, which he established in 1990 in Havana, Cuba.

Gaston Guzman's significant contribution to mycology includes founding the Mycological Herbarium at the National School of Biological Sciences (ENCB) in Mexico City in 1955, which now houses over 100,000 specimens and is the

largest fungal collection in Mexico. His daughter, Laura Guzmán Dávalos, born in 1961 and a prominent mycologist, biologist, and lichenologist, has carried on her father's pioneering work in fungal research.

Guzman's scholarly achievements were recognized in 1971 when he was awarded a Guggenheim Memorial Foundation Fellowship. This grant supported his pivotal work on the *Psilocybe* genus, leading to the publication of *The Genus Psilocybe: A Systematic Revision of the Known Species* in 1983. This comprehensive monograph, detailing the history, distribution, and chemistry of hallucinogenic species, remained a focus throughout his career. He continually updated and expanded this reference, even adding new species, up until his death from pneumonia in 2016.

For the dedicated mycophile and mushroom forager still delving into the rich field of mycology, Gaston Guzman remains an enduring figure in the annals of mushroom research. His extensive work continues to inspire new generations to uncover the intricate and captivating world of fungi. In recognition of his contributions, we offer a humble salute to Gaston Guzman.

GROWTH

GROWTH

Lions Mane substrate

In this months issue of Growth. Lets explore a simple yet effective preparation of Lions Mane substrate. Creating a substrate for cultivating Lion's Mane mushrooms involves a few key steps. This type of mushroom prefers a substrate rich in hardwood materials, as it naturally grows on decaying hardwood trees. Below is a basic guide on how to prepare a suitable substrate for Lion's Mane mushrooms:

Materials Needed

- Hardwood sawdust (oak, alder, beech, etc.)
- Wheat bran or rice bran
- Water
- Large pot or pressure cooker for sterilizing
- Heat-resistant bags for sterilization (autoclave bags)
- A few small nails or an inoculation tool

Step-by-Step Guide

Step 1: Prepare the Substrate Mix

1. Mix Ratio: Combine 80% hardwood sawdust with 20% wheat or rice bran. This ratio helps to provide the necessary nutrients for the mushrooms to grow.

2. Moisture Content: Add water to reach a moisture content of about 60-65%. The substrate should feel moist and hold together when squeezed, but no excess water should drip out.

Step 2: Sterilize the Substrate

1. Packing: Fill the heat-resistant bags with the substrate mix. Don’t pack too tightly; allow some air space for the mycelium to breathe and grow.

2. Sterilization: Seal the bags, leaving a filter patch open for gas exchange. Sterilize the substrate by cooking it in a pressure cooker or large pot. Aim for at least 90 minutes at 15 psi (pounds per square inch) to ensure all contaminants are killed.

Step 3: Inoculation

1. Cool Down: Allow the sterilized bags to cool to room temperature. This can take several hours.

2. Inoculate: Under sterile conditions, introduce Lion's Mane spawn into the bags. Use a small amount per bag, mixing it evenly throughout the substrate.

3. Seal: Once inoculated, seal the bags completely or use a small nail to puncture them for minimal air exchange.

Step 4: Incubation

1. Incubation Conditions: Store the inoculated bags in a dark place with a consistent temperature around 65-75°F (18-24°C).

2. Monitor Growth: Over the next few weeks, check the bags for signs of mycelial colonization. The substrate should become fully colonized and turn white.

Step 5: Fruiting

1. Induce Fruiting: Once the bags are fully colonized, expose them to higher humidity (85-95%), lower temperature (about 60-70°F or 15-21°C), and indirect light.

2. Open the Bag: Make small cuts in the bag to allow mushrooms to emerge.

3. Moisture: Keep the environment humid and mist the openings daily to prevent the substrate from drying out.

Step 6: Harvest

Harvesting: Lion's Mane mushrooms are ready to harvest when they have fully developed their characteristic spines. Harvest before they begin to yellow at the edges.

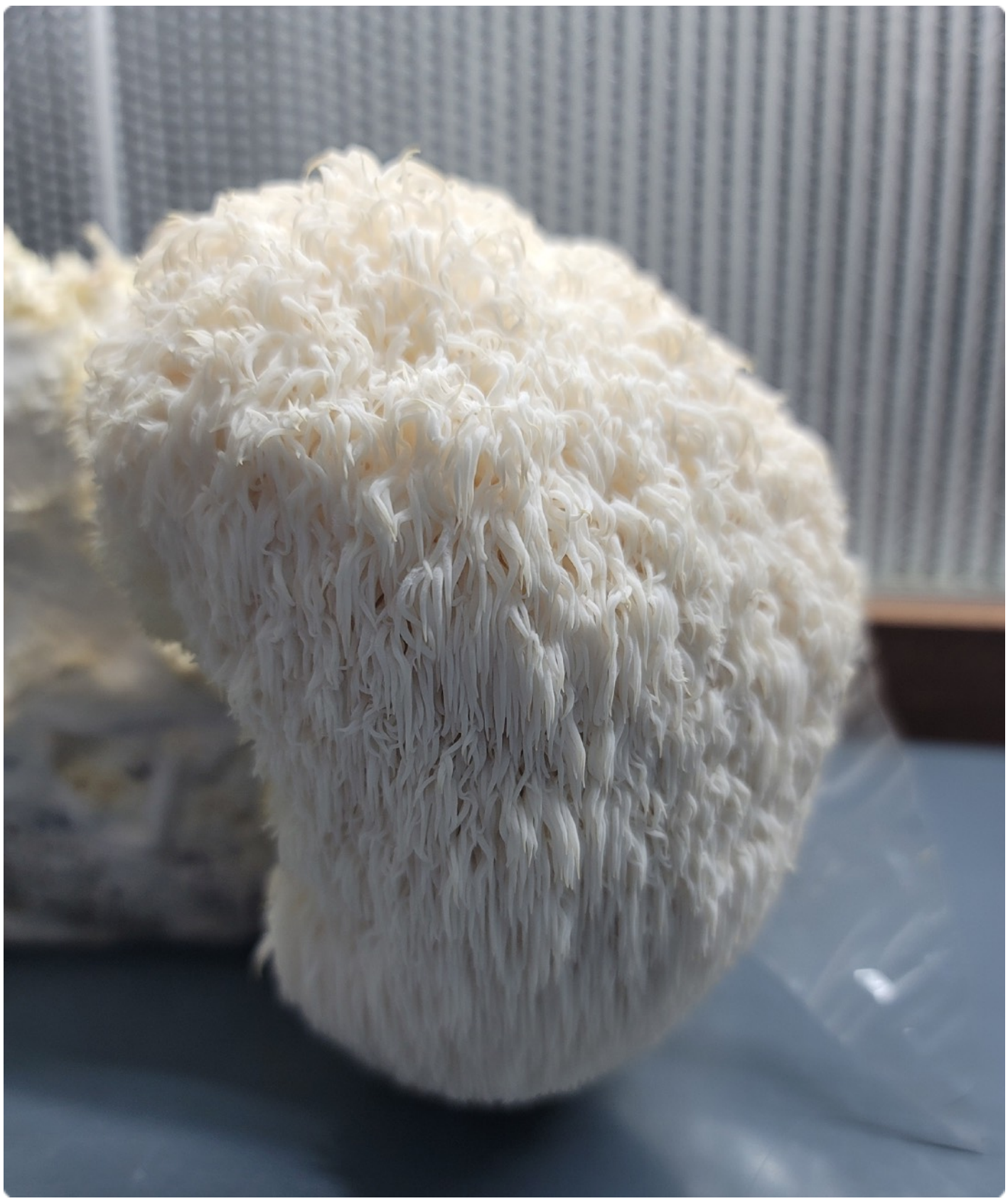
Tips for Success

- Cleanliness: Maintain a clean environment when handling substrates and spawn to avoid contamination.

- Patience: Lion's Mane can take several weeks to start fruiting after colonization.

- Observation: Regularly check your bags for any signs of mold or unusual smells.

This basic guide should help you get started with growing Lion's Mane mushrooms. Remember, each mushroom variety might have specific needs, so it’s beneficial to adjust parameters based on your observations and local conditions.



SPOTLIGHT

SPOTLIGHT

The Enigmatic Lobster Mushroom: Hypomyces lactifluorum

Written By: Basidium Equilibrium

The parasitic Ascomycota fungus that infects other mushrooms. It is not a fungus no a LOBSTER.

In the fascinating world of fungi, the Lobster Mushroom, scientifically known as Hypomyces Lactifluorum, stands out not only for its vibrant color and distinct flavor but also for its unique life cycle. Unlike most mushrooms, which are single organisms, the Lobster Mushroom is the result of a parasitic relationship between a fungus and its host.

The Lobster Mushroom isn't a mushroom per se but rather a fungal parasite that transforms its host into what we recognize as the Lobster Mushroom. The parasite, Hypomyces lactifluorum, attacks certain species of mushrooms, particularly those in the Russula and Lactarius families, altering their appearance, texture, and edibility.

True to its name, the Lobster Mushroom has a bright orange to reddish color, similar to cooked lobster shell, and a somewhat seafood-like aroma. This transformation occurs as the parasitic Hypomyces covers the host mushroom with a hard, dense layer of fungal tissue, changing its shape and color dramatically. The resulting fruiting body can vary significantly in shape due to the irregularity of the parasitic growth, but it typically adopts a rugged, distorted look.

Lobster Mushrooms are found in hardwood and conifer forests across North America, particularly thriving in moist, shaded areas. They are most commonly foraged during the late summer to fall months. Their presence depends on the availability of suitable host mushrooms, which are themselves influenced by local environmental conditions.

The Lobster Mushroom is distinctly seasonal, primarily appearing from late July through October, depending on the region and climate. This seasonality aligns with the growth cycles of the host mushrooms it parasitizes, making late summer and early autumn the ideal times for foragers to find these colorful fungi.

One of the most remarkable traits of the Lobster Mushroom is its ability to transform the inedible or mildly toxic mushrooms into a sought-after culinary delicacy. The parasitism by Hypomyces lactifluorum not only changes the host's physical form but also improves its taste and safety, imparting a nutty, sweet, and richly umami flavor that is highly prized in gourmet cooking.

In the kitchen, Lobster Mushrooms are versatile and can be used in a variety of dishes. They are particularly popular sautéed in butter or oil and make an excellent addition to seafood dishes, pasta, and risottos, lending a mild seafood flavor and a firm, meaty texture.

When foraging for Lobster Mushrooms, it's crucial to go with an experienced guide or forager, as their transformed nature can make them tricky to identify confidently for beginners. Sustainable foraging practices are encouraged to ensure that these fungi can continue to thrive in their natural habitats. This includes harvesting in a manner that allows for regeneration and respecting local guidelines and restrictions on foraging.

The Lobster Mushroom, Hypomyces lactifluorum, is a testament to the complexity and interconnectivity of nature. Its ability to transform its host into a culinary treasure makes it a fascinating subject for mycologists and a coveted find for gourmet foragers. Whether you are a seasoned mushroom hunter or a curious nature enthusiast, the Lobster Mushroom offers a unique glimpse into the world of fungal metamorphosis and ecological interactions.

So get out this fall and find some lobster mushrooms!

FORAGE

Mind Spirit Contact: A Forager's Connection with Nature in Veracruz

Written By: Basidium Equilibrium

Cover Photo: P. Zapotecorum

In the lush, verdant landscapes of Veracruz, a region with a storied history of indigenous psychoactive plant use, there thrives a passionate forager named Chan. Known locally and among dedicated mushroom collectors, Chan has honed his skills in tracking down some of the rarest Psilocybe mushrooms, including the elusive Psilocybe neoxalapensis and the culturally significant Psilocybe zapotecorum.

Chan's journey into mushroom foraging goes beyond the mere collection of fungi; it is deeply intertwined with a profound respect for nature and an intricate understanding of the ecological niches that foster these psychedelic organisms. The Veracruz region, rich in biodiversity and cultural heritage, provides the perfect backdrop for his forays into the forested gullies and shaded waterways where these mushrooms flourish.

Photo: Psilocybe Neoxalapensis

One of Chan's specialties is finding Psilocybe neoxalapensis, a small mushroom with a brownish to purple hue, commonly nestled in the moist, rocky crevices of the region's landscape. This species, known for its rarity and potent psychoactive properties, has become a prized find for serious foragers and mycologists alike.

Recently, Chan discovered a special specimen of Psilocybe zapotecorum. Notably exhibiting a rich sage green hue—an uncommon trait for the species which usually presents a light blonde to dark brown coloration—this find was particularly extraordinary. P. zapotecorum holds a revered place in the local medicinal and ritual practices, historically used by the Zapotec people of Oaxaca for its psychoactive effects that were believed to facilitate spiritual communication and healing. Psilocybe zapotecorum is deeply embedded in the religious and healing rituals of the indigenous cultures of Mexico. The Zapotecs, among others, valued these mushrooms for their ability to connect with the divine, aid in divination, and cure spiritual and physical maladies. The historical use of these mushrooms, documented by early Spanish colonizers, underscores a rich tradition of ethnomycological practices that predate modern records.

When asked about his favorite Psilocybe mushroom, Chan immediately highlighted *P. zapotecorum*. He reminisced about a profound experience 23 years ago in Oaxaca, which distinctly differed from his experiences with *P. cubensis*. He vividly recalled how, during a camping trip, the visual sensation of oil paint-like colors filled his vision after consuming *P. zapotecorum*. He found himself grounded, shoes off and toes on the soil. In a moment of spontaneity he decided that it would be a good idea for him and his friends to climb a mountain and watch the sunset from the mountain top. Once they arrived they had the best view for their mushroom journey. They ended up staying on the mountaintop overnight wadding through a thunderstorm that passed overnight. The intense rains, lightning and thunder connected Chan further to nature.

This intense experience profoundly impacted Chan's outlook on life. It deepened his appreciation for being alive and underscored the importance of health, happiness, gratitude, and respect for nature and others. For Chan, mushrooms have been more than just a psychedelic experience; they have guided him towards a path of personal growth and becoming a better person.

When we talked to Chan we had to know. Why Psilocybin Mushrooms? What drew you into them? He told us; ”Growing up in Mexico, it's common for people to seek the entheogenic experience, often with the guidance of experienced leaders. However, I ventured directly into nature from a young age to discover these substances myself. Raised near a Peyote-rich desert, I first experimented with Peyote. Soon after, friends introduced me to Psilocybe Cubensis, which grew wildly just minutes from my hometown. In a community where tourism and partying prevailed, and where alcohol and drugs were

pervasive, I found solace and direction in the natural world. Engaging with peyote and psilocybin mushrooms not only put me on a better path but also deepened my fascination with psilocybin mushrooms. The more I interacted with them, the more I realized their mysterious nature and beneficial effects, despite adults' warnings. My personal experiences, combined with the rich ancestral knowledge of Mexico, gradually intensified my interest in these enigmatic substances.” -

Beyond his foraging, Chan is an avid photographer, capturing the intricate beauty of these fungi in their natural settings. His photographs serve not only as a personal record of his discoveries but also as a medium to educate and inspire others about the importance of fungi conservation and their ecological roles.

For Chan, mushroom foraging is an act of connecting with Mother Earth, a harmonious interaction with the natural world that reveals its profound mysteries. His dedication to unveiling and sharing the secrets of these fungal allies enhances our understanding of the natural environment.

Exploring the world of psychedelic mushrooms with a forager like Chan - Mind Spirit Contact opens a window into the intricate interplay between culture, history, and nature. His work highlights the critical importance of preserving these traditions and the environments that sustain them, ensuring that future generations can continue to learn from and experience the profound benefits of these remarkable natural resources. Through Chan's eyes, we gain a deeper appreciation for the subtle connections that define our world.

Call for Contributors

Are you a fungi enthusiast or an expert in mycology? We're looking for contributors who can share their unique insights, research, and stories with our community. If you have a passion for fungi and a talent for creating engaging content, we invite you to join our team.

Contributor Opportunities

- **Article Writers**: Explore a broad spectrum of topics including the latest scientific discoveries, innovative cultivation techniques, thrilling foraging adventures, and exquisite gourmet mushroom recipes.
- **Photographers**: Capture the stunning aesthetics of fungi in their natural environments, during cultivation, or as culinary masterpieces, and share these visuals with our audience.
- **Researchers**: Present your latest findings and breakthroughs in our "Hot Science" section, contributing to the cutting-edge discourse in mycology.
- **Foragers and Enthusiasts**: Inspire our readers by sharing your personal foraging stories and practical tips, helping them connect with the natural world in meaningful ways.
- **Community Events**: Keep our community informed by listing upcoming mycology-related events, workshops, conferences, and webinars, making our magazine a go-to resource for those eager to engage with the mycological community.
- **Mycology in the Arts**: Highlight artists who integrate fungi into their art, whether it’s through photography, sculpture, or mixed media. Explore how the aesthetic and ecological attributes of fungi inspire artistic creativity.

These opportunities are designed to build and engage our community, providing a platform for diverse perspectives and insights into the fascinating world of fungi.

How to Contribute: To join us, send a brief proposal outlining your idea and include any relevant samples of your work to:

- **Email:** Support@basidiumequilibrium.com

We're excited to collaborate with you and explore the fascinating world of fungi. Your contributions will help us continue to educate and inspire our readers.

Advertising Options:

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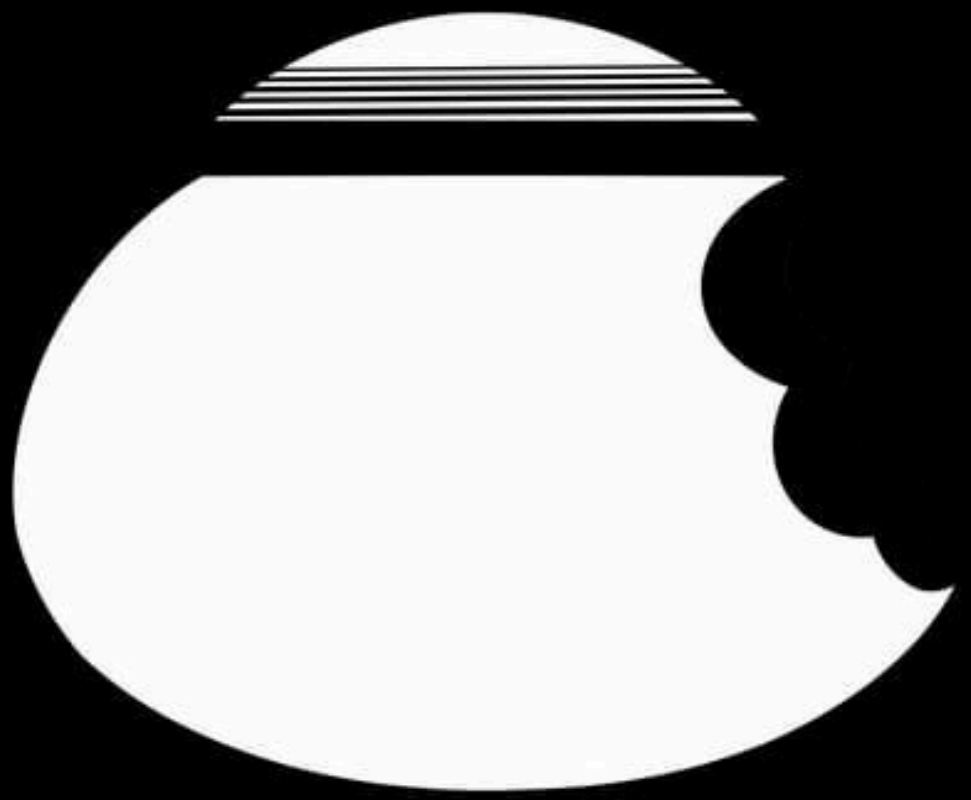

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