

Wild Mushrooms in Nepal : Plate to Poison



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What`s to Come?

Facts about the fungi

Global fungal scenario

Morphological variations

Diversity

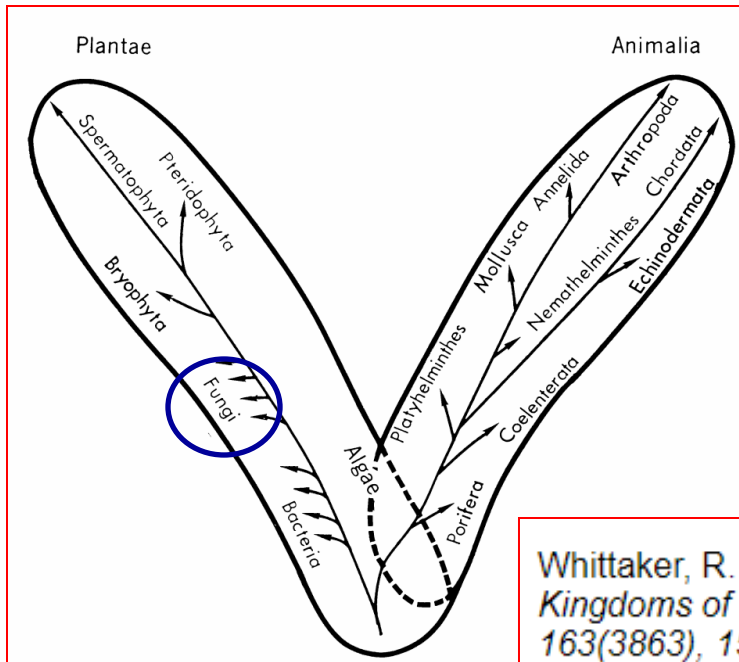
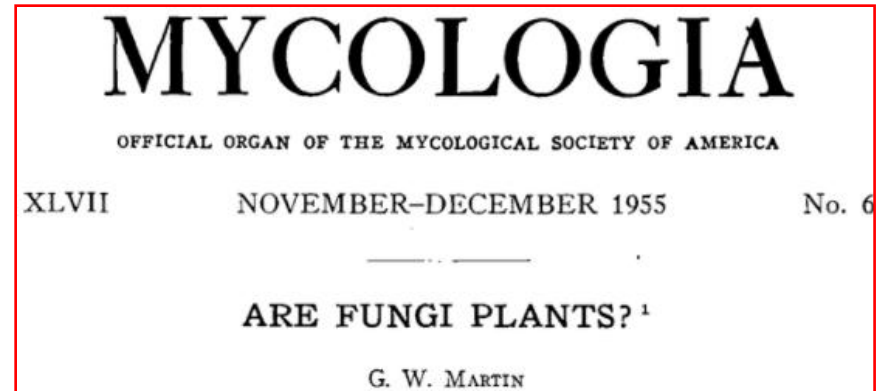
Delicacy and ILK

Poisoning

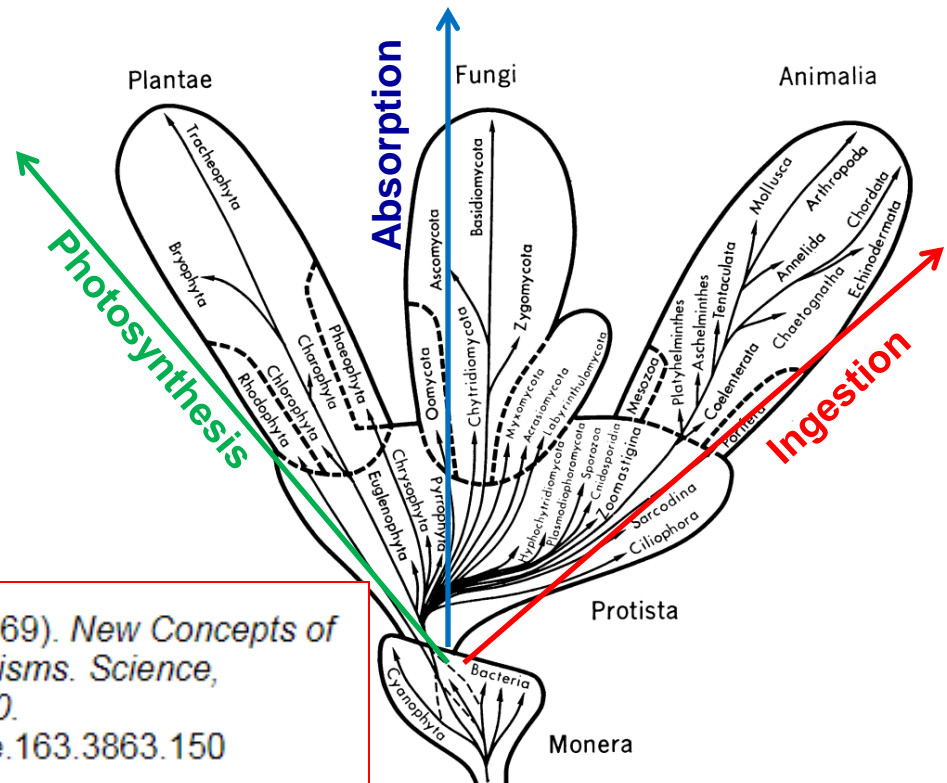
Prospects

Facts about the Fungi

- Fungus (Pl. fungi) = Yeasts, Molds, Mushrooms
- Mycology = Scientific study of fungi
- Distinct kingdom “FUNGI” – The Hidden Kingdom – The Mysterious Kingdom



Whittaker, R. H. (1969). *New Concepts of Kingdoms of Organisms*. *Science*, 163(3863), 150–160.
doi:10.1126/science.163.3863.150



Facts about the Fungi

Where of the two pictures (of plant and animal) below do you think Fungi are more closely related to?

Proc. Natl. Acad. Sci. USA
Vol. 74, No. 11, pp. 5088–5090, November 1977
Evolution

Phylogenetic structure of the prokaryotic domain: The primary kingdoms

(archaeobacteria/eubacteria/urkaryote/16S ribosomal RNA/molecular phylogeny)

CARL R. WOESE AND GEORGE E. FOX*

Department of Genetics and Development, University of Illinois, Urbana, Illinois 61801

Communicated by T. M. Sonneborn, August 18, 1977

ABSTRACT A phylogenetic analysis based upon ribosomal RNA sequence characterization reveals that living systems represent one of three aboriginal lines of descent: (i) the eubacteria, comprising all typical bacteria; (ii) the archaeobacteria, containing methanogenic bacteria; and (iii) the urkaryotes, now represented in the cytoplasmic component of eukaryotic cells.

to construct phylogenetic classifications between domains: Prokaryotic kingdoms are not comparable to eukaryotic ones. This should be recognized by an appropriate terminology. The highest phylogenetic unit in the prokaryotic domain we think should be called an “urkingdom”—or perhaps “primary kingdom.” This would recognize the qualitative distinction between prokaryotic and eukaryotic kingdoms and emphasize

Fungi are closer genetically to animals than to plants, revealed after comparing sequences of ribosomal RNA.



Facts about the Fungi

Fairy Ring of Mushrooms (Picture: From Manang)

- The old belief that fairies danced inside the circle of mushrooms.

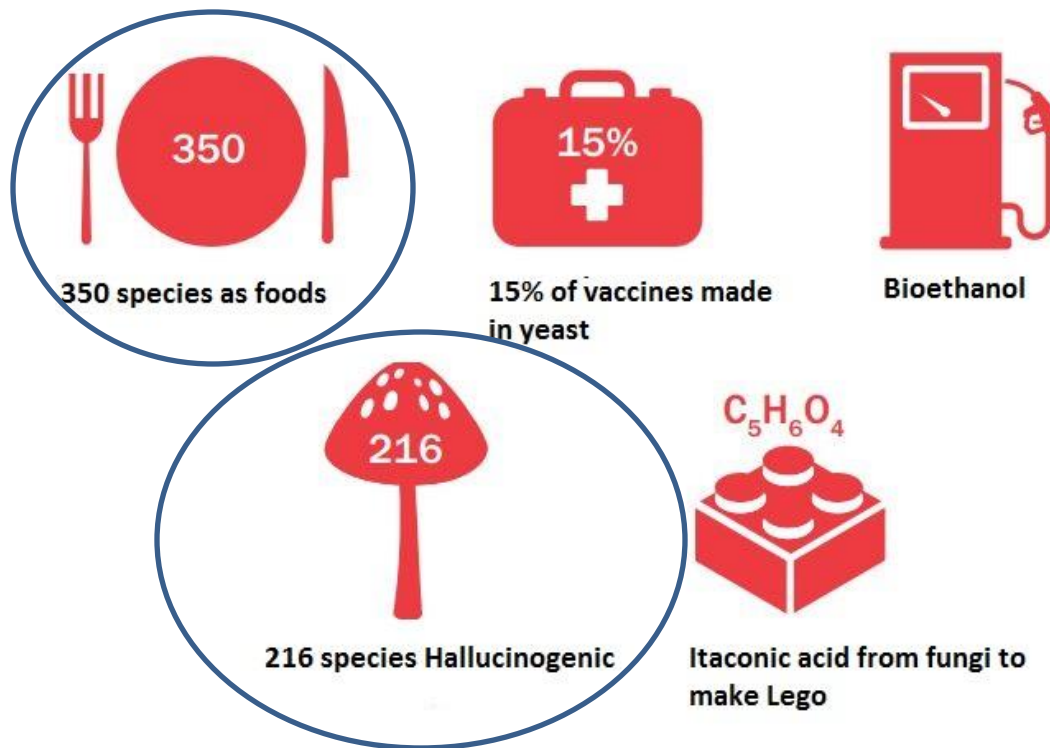


Pics: Steve Trudell

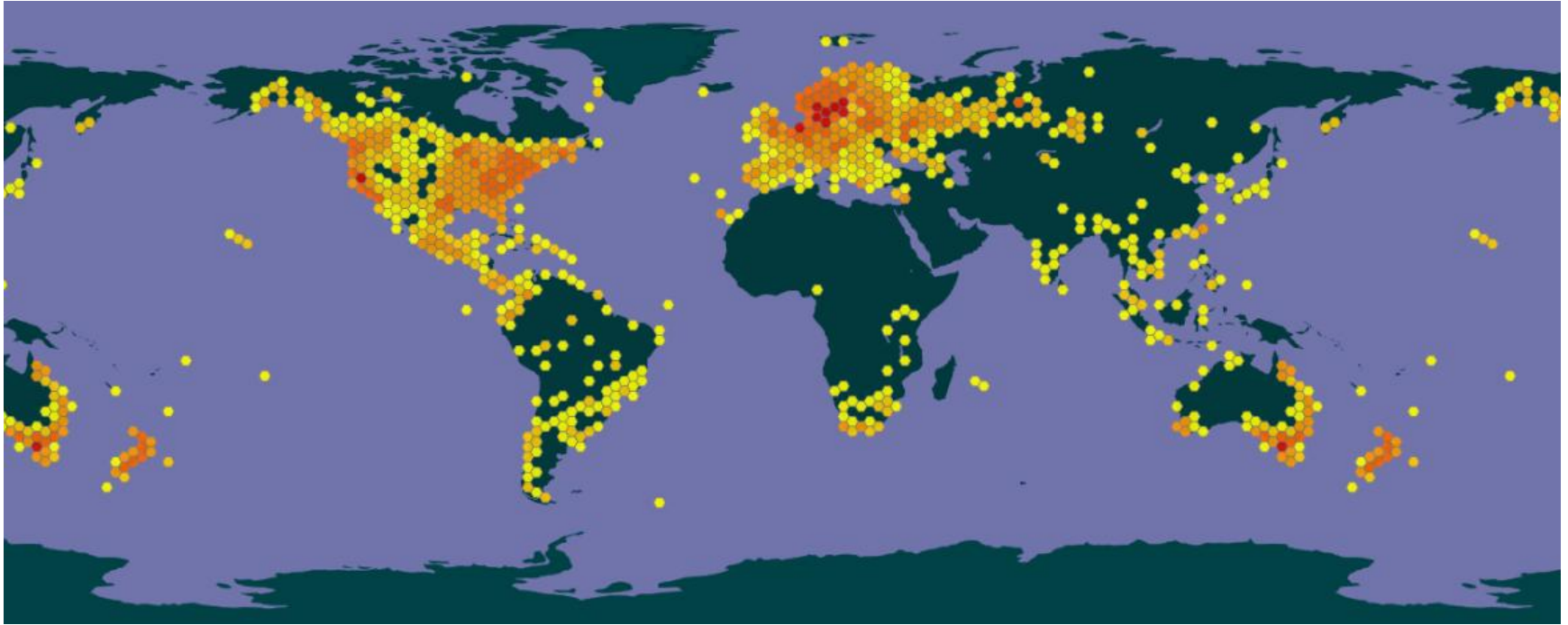


Global Fungal Scenario

- Underrepresented and/or undervalued in academic research, conservation planning, **global and regional assessments** and decision making processes.
- About 14000 mushrooms species are reported (Hawksworth 2001).
- About 1-10 % of mushrooms are predicted to be poisonous (Miles and Chang 1997).



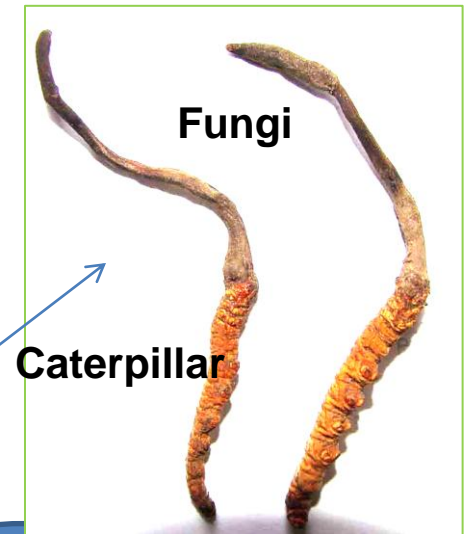
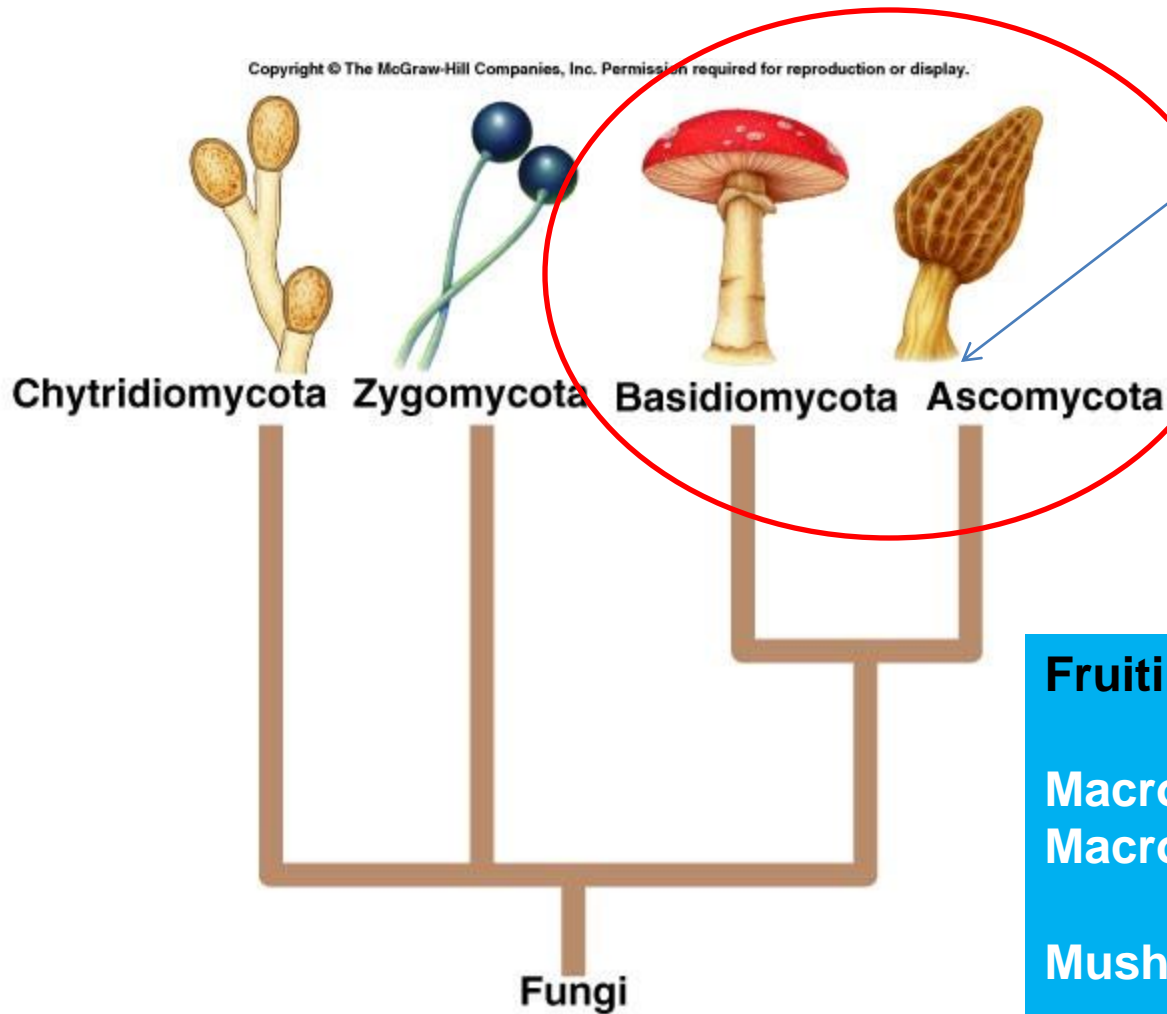
Global Fungal Scenario



Occurrences of Fungi in 2020 @ GBIF

- Seriously lacking in Asian and African Countries
- Less represented from the Global South

Taxonomic Complexes of the Fungi



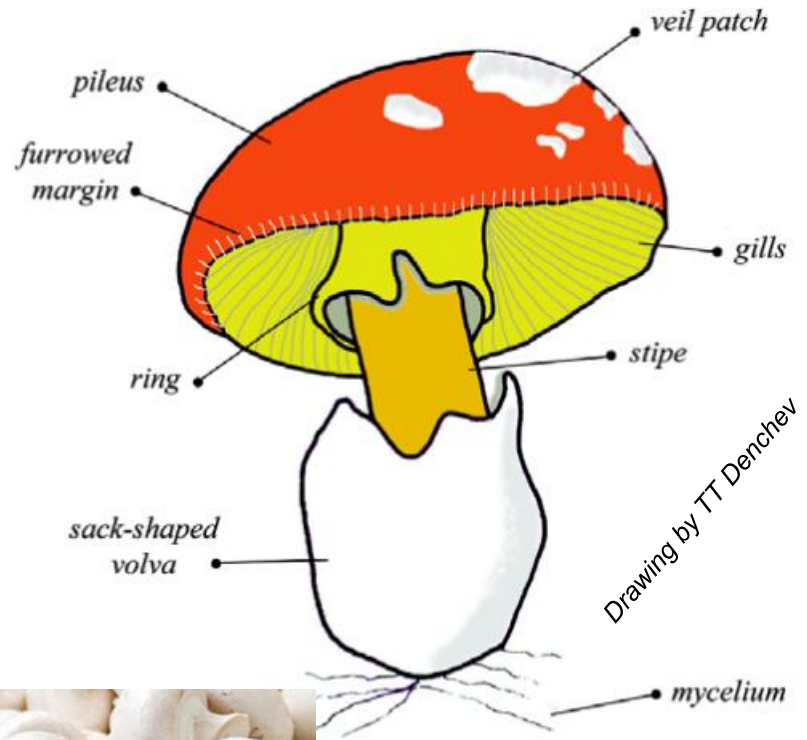
Fruiting bodies of fungi

**Macromycetes
Macrofungi**

Mushrooms / Toadstools

Let's be focused on mushrooms

Mindset:
Cultivated
Species



Pleurotus sp
कन्ने

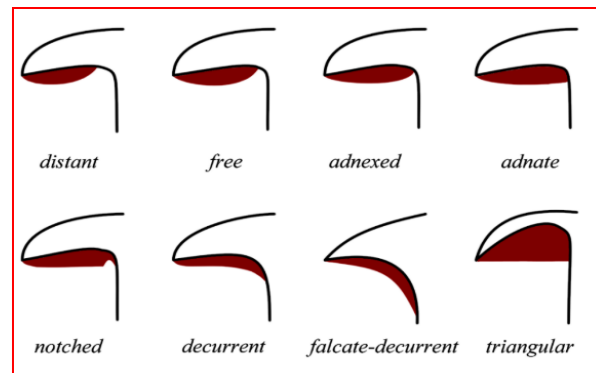
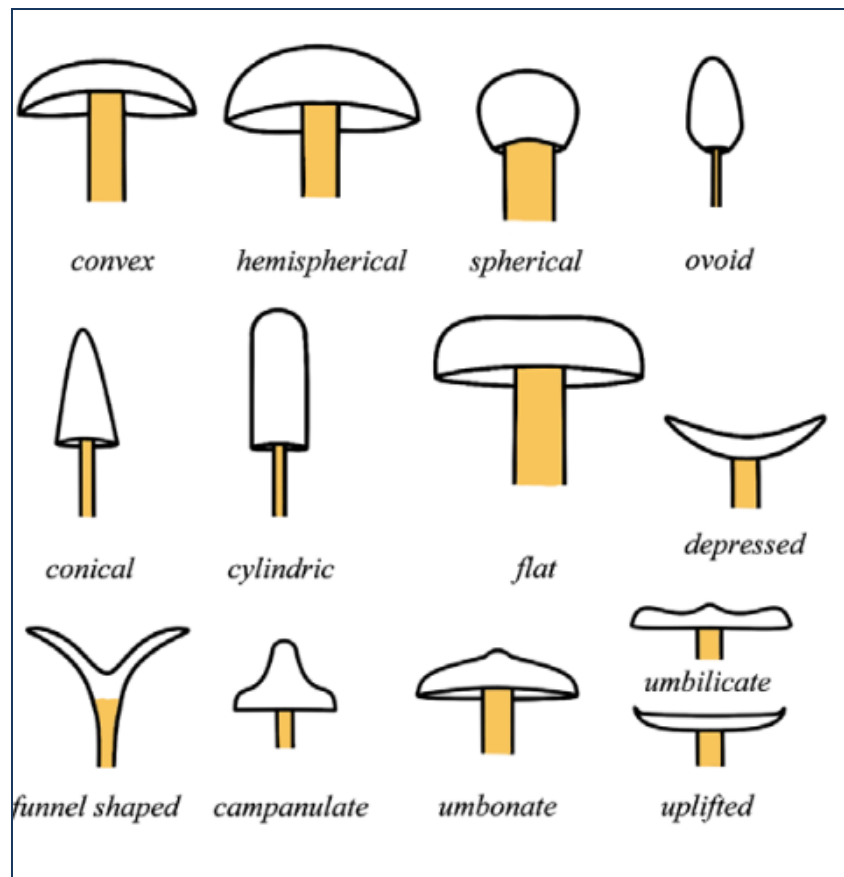
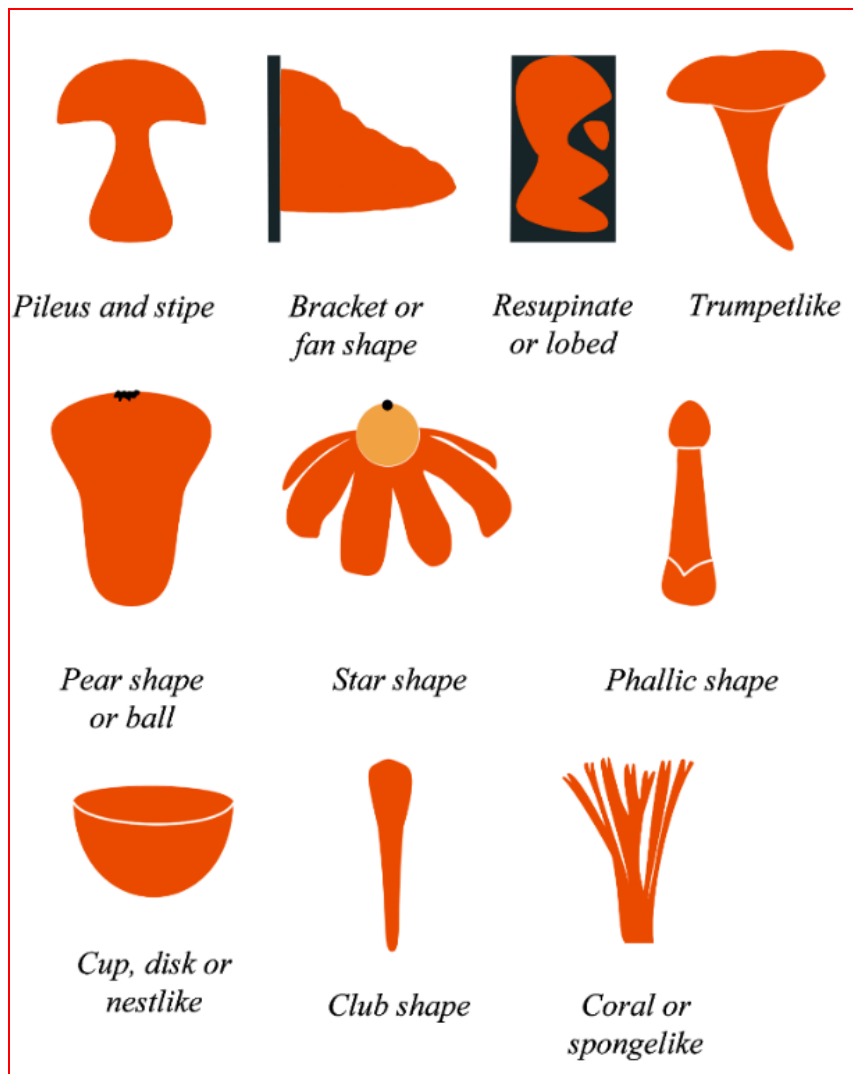


Agaricus sp.
गोब्रे , डल्ले



Ganoderma lucidum
रातो

Morphological Variations of Wild Mushrooms



BUTTERFLIES of the ground

Drawings by TT Denchev

Mushroom Diversity : Nepal

Family : 108 Genera : 357

Species : 1291
(Ascomycota : 65 and Basidiomycota : 126)

Plant Diversity in Nepal, 2020, 41-54

Eds.: M. Siwakoti, P.K. Jha, S. Rajbhandary, S.K. Rai

Publisher: Botanical Society of Nepal, Kathmandu

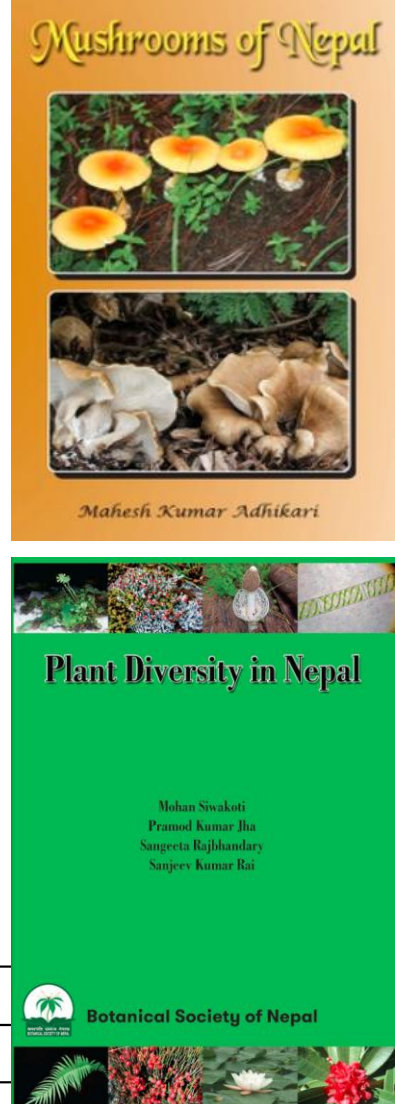
Wild Mushrooms of Nepal

Shiva Devkota^{1*} and Hari Prasad Aryal²

¹Global Institute for Interdisciplinary Studies (GIIS), Kathmandu, Nepal

²Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu, Nepal

Email: shiva.devkota@gmail.com



Mushrooms with different use values in Nepal

Edible	Medicinal	Toxic	Others
159	74	100	25

Endemic Mushrooms of Nepal

SN	Species	SN	Species
1	<i>Arcyria aureoglobosa</i> Yamamoto	18	<i>Phellinus poltii</i> Ryvar den
2	<i>A. nepalensis</i> Poelt	19	<i>P. subsanfordii</i> Hattori
3	<i>A. poeltii</i> Nannenga-Bremekamp and Yamamoto	20	<i>Pholiota microspora</i> (Berk.) Sacc. var <i>himalensis</i>
4	<i>B. substerilis</i> Kreisel	21	<i>Pleurotus nepalensis</i> Corner
5	<i>B. vascelloides</i> Kreisel	22	<i>Russula chloroides</i> var. <i>godavariensis</i> Adhikari
6	<i>Bovistella poeltii</i> Kreisel	23	<i>R. delica</i> var. <i>dobremezii</i> Adhikari
7	<i>Chroogomphus asiaticus</i> Miller and Aime	24	<i>R. kathmanduensis</i> Adhikari
8	<i>Clavulina alta</i> Corner	25	<i>R. nepalensis</i> Adhikari
9	<i>Disciseda ochrochalcea</i> Kreisel	26	<i>Secotium himalaicum</i> Zang and Doi
10	<i>Lactarius thakalorum</i> Bills and Cotter	27	<i>Spathularia bifurcata</i> Otani
11	<i>Lycogala fuscoviolaceum</i> Onsberg	28	<i>Stereum endocrocinum</i> Berk.
12	<i>Lycoperdon altimontanum</i> Kreisel	29	<i>Termitomyces arghakhanchensis</i> Aryal *
13	<i>L. elongatum</i> Berk.	30	<i>T. palpensis</i> Aryal *
14	<i>L. lambinonii</i> var. <i>quercetorum</i> Kreisel	31	<i>Trichaptum montanum</i> Hattori
15	<i>Mollisia dhankutae</i> Balfour-Browne	32	<i>Valsa nepalensis</i> (Berk.) Sacc.
16	<i>Ophiocordyceps nepalensis</i> Sung, Hywel-Jones and Spatafora	33	<i>Xeromphalina aspera</i> Mass
17	<i>Pachykytospora nepalensis</i> Hattori	34	<i>Xylaria fistuca</i> Berk.

* Submission on MycoBank is in progress.

Devkota & Aryal, 2020

GIIS Webinar Series No 13 : 24 Aug 2020 : By Dr. Shiva Devkota



Lactarius thakalorum

(Thakalis of Mustang)

Endemic Mushrooms of Nepal

MYCOTAXON

Volume XLIII, pp. 25-31

January-March 1992

AMANITA CHEPANGIANA—A NEW SPECIES FROM NEPAL

Rodham E. Tulloss

P. O. Box 57, Roosevelt, New Jersey 08555-0057
U. S. A.

Hemanta Ram Bhandary

Department of Botany, University of Tennessee
Knoxville, Tennessee 37996-1100
U. S. A.



<https://www.gbif.org/occurrence/1829970836>

OCCURRENCE | 26 NOVEMBER 2013

Amanita chepangiana Tulloss & Bhandary

Collected in Japan

Fungi > Basidiomycota > Agaricomycetes > Agaricales > Amanitaceae > *Amanita*

Nepal # Just started to scratch the surface of knowledge of this intriguing kingdom of organisms

Initiation to Minimize Knowledge Gap (Taxonomy / Distribution)

Project: Digitization of mycological collections (**Wild mushrooms and Lichens**) in Nepal

Duration: July 2020 – June 2021 (Delayed due to the COVID-19 pandemic)

Programme BIFA: Biodiversity Information Fund for Asia

Funded by Ministry of the Environment, Government of Japan

Partners

Central Department of Botany, Tribhuvan University

Department of Plant Resources, Ministry of Forests and Environment,
Government of Nepal

Natural History Museum, Tribhuvan University

Project lead Global Institute for Interdisciplinary Studies

Contact: Shiva Devkota

Common Edible Mushrooms in Nepal

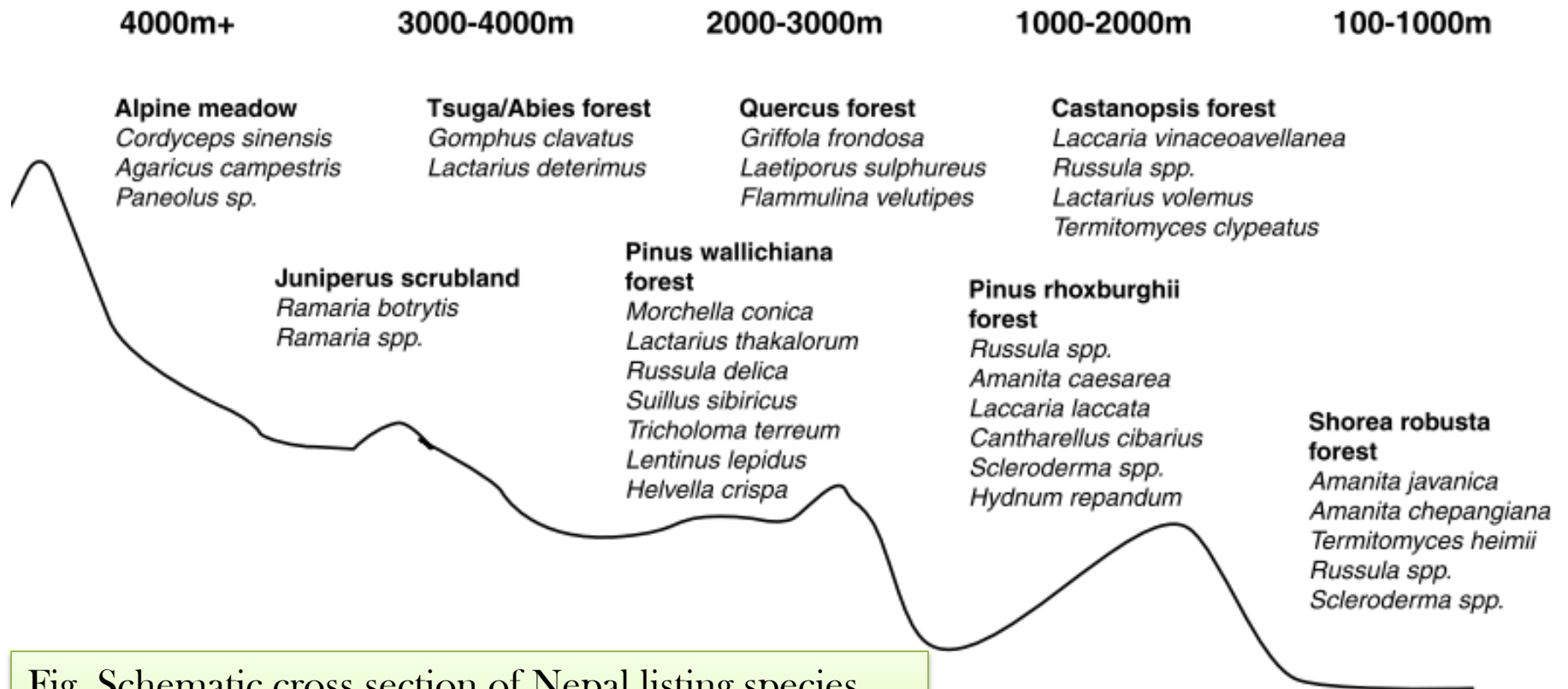


Fig. Schematic cross section of Nepal listing species commonly used at different altitude

Christensen et al 2010

Collection and Use of Wild Edible Fungi in Nepal¹

MORTEN CHRISTENSEN,^{2,*} SANJEEB BHATTARAI,³ SHIVA DEVKOTA⁴
AND HELLE O. LARSEN²

Economic Botany, 62(1), 2008, pp. 12–23

© 2008, by The New York Botanical Garden Press, Bronx, NY 10458-5126 U.S.A.

Habitat

Eco-region ^a	No. of species ^b
Dry Sub-alpine forest (3000–4000 meters—m): <i>Juniperus</i> spp., <i>Pinus wallichiana</i> , <i>Betula utilis</i>	39
Temperate Coniferous forest (2500–3000 m): <i>Pinus wallichiana</i> , <i>Tsuga dumosa</i> , <i>Abies</i> spp.	66
Temperate Broadleaved forest (2000–2500 m): <i>Quercus</i> spp., <i>Alnus nepalensis</i>	54
Subtropical Coniferous forest (1000–2000 m): <i>Pinus roxburghii</i>	56
Subtropical Broadleaved forest (1000–2000 m): <i>Schima wallichii</i> , <i>Castanopsis</i> spp.	54
Tropical Broadleaved forest (100–1000 m): <i>Shorea robusta</i> , <i>Bombax ceiba</i>	37

Ethnic Groups

Ethnic group	No. of species
Tamang	56
Magar	51
Gurung	47
Dalit	34
Chhetri	31
Bhotia	29
Brahmin	27
Thakali	26
Sherpa	23
Newar	22

Species with market value

Species
<i>Laccaria</i> spp.
<i>Cantharellus cibarius</i>
<i>Lactarius thakalorum</i>
<i>Russula delica</i>
<i>Tricholoma terreum</i>
<i>Morchella conica</i>
<i>Lateriporus sulphureus</i>
<i>Ramaria</i> spp.
<i>Termitomyces heimii</i>
<i>Grifola frondosa</i>

RESEARCH

Open Access

Mushroom hunting and consumption in twenty-first century post-industrial Sweden



Ingvar Svanberg^{*} and Hanna Lindh

Authors		Year	Publication
BP Varghese, P Amritkumar	Comparative Study on Cultivation of Oyster Mushrooms using Nutrition Enhancing Substrates	2020	Int. J. Sci. Res. in Biological ...
MU Ukwuru, A Muritala, LU Eze	Edible and non-edible wild mushrooms: Nutrition, toxicity and strategies for recognition	2018	J. Clin. Nutr. Metab
SR Sajon, S Sana, S Rana...	Mushrooms: Natural factory of anti-oxidant, anti-inflammatory, analgesic and nutrition	2018	Journal of ...
S Chatterjee, MK Sarma, U Deb, G Steinhauser...	Mushrooms: from nutrition to mycoremediation	2017	... Science and Pollution ...
D Bederska-Łojewska, S Świątkiewicz...	The use of Basidiomycota mushrooms in poultry nutrition—A review	2017	Animal Feed Science and ...
QQ Tang, YX You, YW Li, SQ Zeng...	The status of edible mushrooms resource development and nutrition evaluation in Sichuan province, China	2016	The International ...
M Matijević	The possibility of using residues from the production of mushrooms in nutrition of layers	2015	
AR Leal, L Barros, JCM Barreira, MJ Sousa...	Portuguese wild mushrooms at the "pharma-nutrition" interface: Nutritional characterization and antioxidant properties	2013	Food Research ...
RQ Ji, SY Ma, YJ Wang, Y Li	Optimization of nutrition factors and cultural conditions for artificial culture of three mycorrhizal mushrooms.	2013	Journal of Northeast Forestry ...
LG García-Montero, I Valverde-Asenjo...	Influence of edaphic factors on edible ectomycorrhizal mushrooms: new hypotheses on soil nutrition and C sinks associate...	2012	... mushrooms
S Andres, N Baumann	Mushrooms: Types, Properties, and Nutrition	2012	
P Kalač	... and Nutritional Value of European Species of Wild growing Mushrooms. U: Andres, S. and Baumann N.(Eds). Mushrooms...	2012	
OV Yashchenko	Food and biological role of edible and medicinal mushrooms in the nutrition	2012	Gigiena naselenyh mists
HA El Enshasy, P Maftoun, RA Malek	Pleuran: Immunomodulator polysaccharide from pleurotus ostreatus, structure, production and application. Mushrooms: ...	2012	
M Taghizadeh	Mushrooms: Types, Properties and Nutrition	2012	
N Gaglarirmak	Chemical composition and nutrition value of dried cultivated culinary-medicinal mushrooms from Turkey	2011	International journal of medicinal mushroom...
DC Zied, JM Savoie, A Pardo-Giménez	Soybean the main nitrogen source in cultivation substrates of edible and medicinal mushrooms, soybean and nutrition	2011	Hany El-Shemy (Ed)
ZL Yang	Mushrooms, Health and nutrition	2011	Mushrooms in Forests and Woodlands: Res...
LO Antonenko, VM Kuchma...	THE INFLUENCE OF NUTRITION SOURCES ON GROWTH AND ANTIOXIDANT ACTIVITY OF MUSHROOMS OF GENUS CORIO...	2010	Naukovi visti NTUU ...
S Redzic, A Biscevic, A Redzic	USE OF EDIBLE MUSHROOMS AND LICHENS IN ADDITIONAL NUTRITION OF PEOPLE IN WAR IN BOSNIA AND HERZEGOVINA...	2009	African Journal of Traditional ...
VC Taveira, M Novaes, G Carvalho	Consumption of mushrooms in human nutrition: a review of literature Com	2007	Ciências Saúde
PS Ranote, AS Bawa, R Chawla	Edible mushrooms-- Nutrition and health attributes	2007	Indian Food Industry
M Singh, N Gupta	Protein and essential amino acid status of edible mushrooms as affected by mineral nutrition	2006	Indian Journal of Agricultural Biochemistry
M Calvo, LH Garthoff, RB Raybourne...	... for food safety and applied nutrition and the mushroom council collaborate to optimize the natural vitamin D content of...	2006	2006 FDA Science ...
Y Akakabe, K Matsui...	... -Stereochemical Correlation between 10-Hydroperoxyoctadecadienoic Acid and 1-Octen-3-ol in Lentinula edodes and Tr...	2005	Bioscience ...
K MURAMATSU, A SUZUKI, Y TERASHIMA...	Desirability of Mushrooms by Students Studying Nutrition	2004	Journal of Home ...
EF Solomko	The International Conference on " Perspectives of Medicinal Mushrooms in Health Care and Nutrition in the 21st Century"	2002	International Journal of Medicinal Mushroom...
T Hashimoto, Y Nonaka...	Food & Nutrition Science-Suppressive Effect of Polysaccharides from the Edible and Medicinal Mushrooms, Lentinus edod...	2002	Bioscience ...
R Kumuthakalavalli, RL Xavier	MUSHROOMS FOR THE HEALTH AND NUTRITION OF THE AGED	2000	Ageing in Rural ...
RH Kurtzman	Nutrition from mushrooms, understanding and reconciling available data	1997	Mycoscience
S Yrmoliyk	Cultivation of mushrooms—way determination of problem nutrition	1995	Propozutsia

Mushrooms Edibility @ Cultural and Social Settings



Termitomyces clypeatus (Taplejung)



Agaricus bisporus (Dolpa)



*Laetiporus sulphureus** (Eastern Nepal) *Termitomyces* sp (Bardia)



*Photos by Kamal Maden

Mushrooms Edibility @ Cultural and Social Settings



***Ramaria botrytis* (Manang)**



***Pseudocraterellus undulatus* (Manang)**

Mushrooms Edibility @ Cultural and Social Settings



Russula species (Dakshinkali)



Scleroderma sp (Nagarkot)



Grifola frondosa (Lumle, Kaski)

Mushrooms Edibility @ Cultural and Social Settings



Lactarius thakalorum (Mustang)



Lactifluus volemus (Sagarmatha)



L.indigo (Basantpur, Panchthar)

Together we Learn



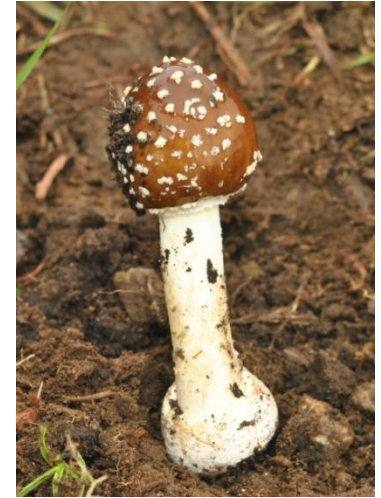
Common Poisonous Mushrooms of Nepal



Amanita citrina (Kaski)*



A. longistrata (Palpa)*



A. pantherina (Gorkha)



Amantia complex



*Photos by Morten Christensen

Edible Vs Poisonous Mushrooms

General belief	Status	Edible species	Poisonous Species
All mushrooms growing on live trees are edible.	False	<i>Pleurotus sp.</i> <i>Lentinus sp.</i> <i>Laetiporus sp.</i>	<i>Omphalotus olearia.</i>
All the mushrooms growing on decaying straw or manure are poisonous.	False	<i>Coprinus comatus</i>	<i>Stropharia sp.</i> <i>Psilocybe sp.</i> <i>Coprinus disseminatus</i>
All soil inhabiting species are deadly poisonous	False	<i>Morchella conica,</i> <i>Russula delica,</i>	<i>Amanita muscaria</i> <i>phalloides</i>
Bright coloured mushrooms are poisonous	False	<i>Amanita caesarea,</i> <i>Cantharellus cibarius</i> <i>Tricholoma nuduns</i>	<i>Amanita pantherina,</i> <i>A. muscaria,</i> <i>Russula emetica,</i>
Mushrooms with rough warty cap and texture are poisonous	False	<i>Amanita rubescens,</i> <i>Microlepiota procera</i>	<i>Pholiota adipose</i> <i>Amanita cokeri</i>
Mushrooms whose flesh changes after touching and brushing are said to be poisonous	False	<i>Boletus cyanescens</i>	<i>Boletus luridus</i>

Edible Vs Poisonous Mushrooms

Mushrooms **bearing vulva** are poisonous.

Mushrooms **bearing annulus** (ring) is poisonous

Mushrooms which cause milk or **egg to coagulate** are said to be poisonous

Mushrooms that produce **latex** on being injured are said to be poisonous

Mushrooms with **bitter, acrid** or pungent taste are poisonous

Poisonous mushrooms can be **detoxified** after boiled in water with or without salt or vinegar

All mushrooms loose their poison through **exsiccations**

Poisonous mushrooms **tarnish a silver spoon**, onion, and garlic pieces.

Mushrooms that are consumed by **flies, squirrels, cats, monkeys** are edible to humans.



To minimize poisoning (Indigenous Local Knowledge)

- Avoid unknown species
- Boil mushrooms in mild salt water, turmeric Powder before cooking
- Do not store long time in Plastic bags/containers
- Do not eat large amount in first time
- Add vinegars while cooking

Treatments

Vomiting / Vinegars / Mild black tea / Doctors

Paris poryphylla (Satuwa), *Xanthoxylum armatum* (Aakhen Timur), *Allium sativum* (Lasun)



nature

Published: 08 February 1996

Mycophobia and mycophilia

David L. Hawksworth

Nature 379, 503–504(1996) | [Cite this article](#)

109 Accesses | 7 Citations | 0 Altmetric | [Metrics](#)

Mushrooms: Poisons and Panaceas - A Handbook for Naturalists, Mycologists, and Physicians.



Poisoning Tragedy PALPA @ 2005



Groups of poisonous mushrooms

Type I

- Locally acting poison (s)
- Gastrointestinal tract
- Toxicity develops in 1-2 h after consumption
- Eg. *Agaricus xanthodermus*

Type II

- Affects nervous system
- Nausea, Diarrhea
- Sweating, Vomiting
- Toxicity develops after 2 hr after consumption
- Even uncontrolled laughter/crying
- Hallucinations
- Loss of consciousness
- Eg. *Amanita pantherina*, *A. muscaria*, *A. citrina*

Type III

- Affects the liver, kidneys, and damage other vital organs, cells and central nervous system
- Toxicity appear very later after 8-48 h
- Lethality
- Eg. *Amanita phalloides* (Death cap), *Hypholoma fasciculare*

Govorushko *et al* (2019)

Poisoning Tragedy DOLPA @ Today 08.24.2020

रामचन्द्र न्यौपाने
डोल्पा

२०७७ भदौ ८ सोमबार १३:३२:००

21

SHARES



समाचार

डिजिटल संस्करण

विषालु च्याउ खाँदा डोल्पामा चार सिकिस्त, हेलिकोप्टरबाट उद्धार

हिमाली जिल्ला डोल्पामा विषालु च्याउ खाँदा चारजना सिकिस्त बिरामी परेका छन् ।

J. Nat. Hist. Mus. Vol. 23, 2008, 51-59

DISTRIBUTION AND STATUS OF HIGHLAND MUSHROOMS: A STUDY FROM DOLPA, NEPAL

S. Devkota

This study comprises report on mycological exploration in 2006 at the most remote and highland district, Dolpa of Western Nepal. The study area was virgin for mushrooms study. Forty four species were collected, out of which 40 are new to the area. The collected species are parasitic, saprophytic and mycorrhizal associates' in habitat. Locally 22 and five species were used for culinary and medicinal values respectively. *Cordyceps sinensis*, *Morchella conica*, *M. esculenta*, *Laetiporus sulphureus*, *Agaricus bisporus*, *Termitomyces clypeatus* and *Cantharellus cibarius* are most popular and potential resources from the study sites.

Poisoning Tragedy DOLPA @ Location: Pokepani, Dolpa



Poisoning Tragedy DOLPA @ Today 08.24.2020

- in the year 2001, a collector (40 years old) from Rimi VDC died after consumption of poisonous mushrooms.
- In 1992, four family members of Mr. Manchandra Buda, from Tripurakot VDC, neighboring VDC of Majphal suffered from mushroom poisoning, but no any death incidents occurred.
- Locally poisonous mushrooms are called Bhoot chyau and Bhatkhoriyau chyau. Local people of Raha and Majphal used Satuwa (*Parish poryphylla*) and Timur (*Xanthoxylum armatum*), to minimize possible poisoning along with vinegar.



Laetiporus sulphureus (Dolpa)



Agaricus bisporus (Dolpa)

Measures are needed to reduce human poisoning and fatalities

नयाँ पत्रिका

वि.सं २०७७ आश्विन १२ सोमवार Monday, 27 July, 2020



मुख्य समाचार समाचार दृष्टिकोण अर्थ मल्लिमिडिया अन्तर्वार्ता खेलकुद विश्व कर्नाट किक सम्पादकीय फिचर प्रदेश

च्याउ



विषालु च्याउ खाँदा एकको मृत्यु, आठजना बिरामी



विषालु च्याउ कसरी चिन्ने ?



नवलपरासीमा जंगली च्याउ खाँदा एकैदिन १६ जना बिरामी



संखुवासभामा जंगली च्याउ खाएर बिरामी हुने १० पुगे



जंगली च्याउ खाँदा पाँचजना बिरामी



अर्घाखाँचीमा जंगली च्याउ खाँदा एकको ज्यान गयो, तीनजना बिरामी



नवलपरासीमा जंगली च्याउ खाँदा सात जना बिरामी



सिकाइमै सीमित बन्यो गोब्रे च्याउ खेती, प्राविधिकले नै जानेनन् सिकाउन !



जंगली च्याउ विषयक जानकारी तथा सचेतना कार्यक्रम

Knowledge Sharing and Awareness Programme on Wild Mushrooms

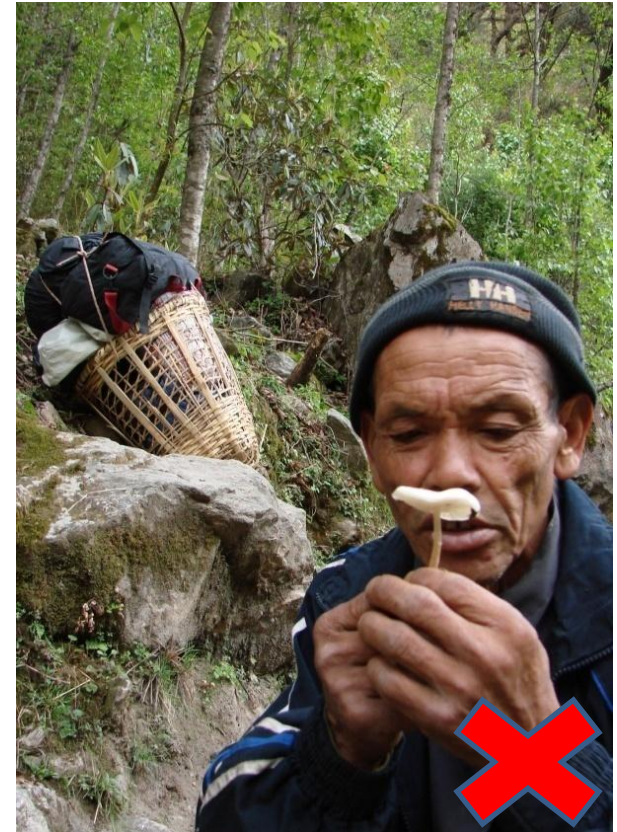
Supported by

In collaboration with

जोखिम कमगर्न सकिने उपायहरु

- सडेका, किराले खाएर वाँकि रहेका, धेरै कलिलो अनि फक्सिकेकाच्याउहरु खानुहुदैन् ।
- कतिपय प्रजातीहरु (ल्याक्टारियस भोलिमस- दुधे च्याउ) काँचै खानमिल्ले भनेतापनि त्यसरी खानु हुदैन् ।
- परिपक्व मानिस अथवा सम्भव भएसम्म च्याउ विज्ञसंग परामर्श लिएर मात्रखाने गनुपर्दछ ।
- च्याउ र दुध, अनि च्याउ र अल्कोहल खाँदा खाना विषाक्तहुनसक्ने भएको कारणले यस्तो संयोजन सकेसम्म गर्नु हुदैन् ।
- दुई वा सो भन्दा बढि प्रजातीका च्याउहरु एकै पटक खानु हुदैन् ।
- खानहुने च्याउनै पनि यदि कसैले पहिलो पटक खानलागेको हो भने धेरै मात्रामा खानहुदैन् ।
- खानहुने च्याउको आसपासमाअन्यकुनै विषालु च्याउहरु उमेका हुनसक्दछन् जसले गर्दा विभिन्नमाध्यमद्वारा विषाक्त कणहरु खानहुने च्याउसम्मपुग्न सक्दछन् । यसकारण कुनै पनि जंगलीच्याउ खानु पूर्व लगभग दश मिनेट नुनपानीमा वफाउनु पर्दछ ।
- प्लाष्टिकको फोला, टिनको वाकस जस्ता गुम्सने भाँडामा कहिल्यै पनि च्याउ संकलनगर्नु हुदैन् । यसले गर्दा च्याउगुम्सेर विग्रन सक्दछ, त्यस्तोच्याउखानु स्वास्थ्यको लागित्यति राम्रोहुदैन् ।
- च्याउ पकाउदा दुई - चार थोपा अमिलो राख्नु पर्दछ ।
- विषालु च्याउखाएको शंका लागेमा प्रशस्तमात्रामा मनतातो नुनपानि पिउनु पर्दछ । अमिलो, सतुवा, आँखे टिमुर र लसुनमिसाएर पिधेर खानु पर्दछ, र जतिसक्दो छिटो स्वास्थ्य केन्द्र जानुपर्दछ ।

Look but don't touch if you are in doubt 😊



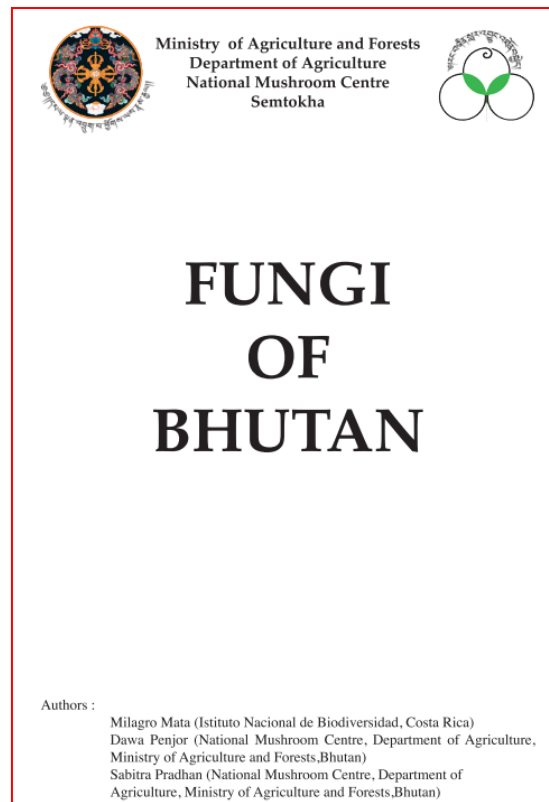
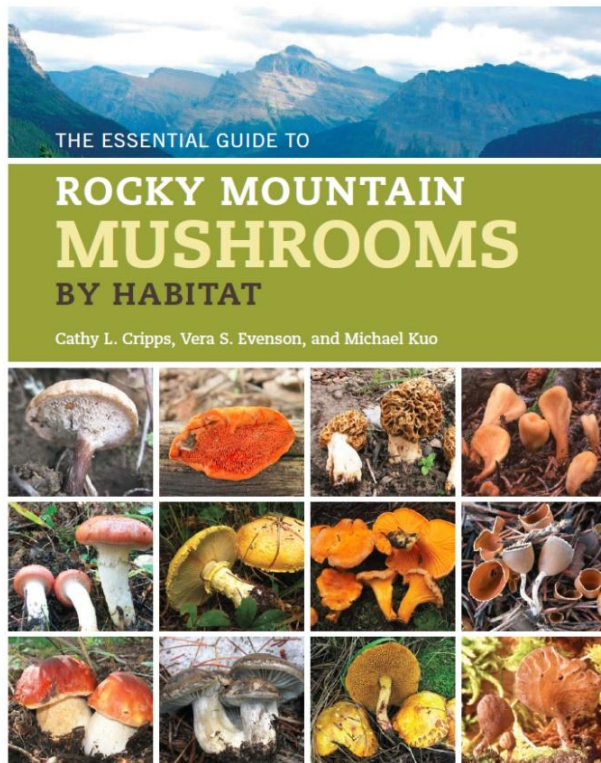
All fungi are edible but some are only edible once !



Hit and trail doesn't count here !

What we needed now?

.....lessons from others



Domestication

High Altitude
Research Station

For biological,
physical studies
related onsite station.

Alarming Bell # IPBES Global Assessment Report 2019



Goals for conserving and sustainably using nature and achieving **sustainability cannot be met by current trajectories**, and goals for 2030 and beyond may only be achieved through **transformative changes across economic, social, political and technological factors.**



Mushrooms and Conservation Targets

- Responsible for incredibly important processes like global cycling of nutrients, carbon sequestration, and even the prevention of desertification.



- Support integrated delivery of sustainable development goals (**2 #** hunger, food security and nutrition, **3 #** good health and well being, **13 #** climate change; and **15 #** life on land).
- Support the Strategic Plan for Biodiversity (2011-2020) and the **Aichi Target- 14** (Ecosystem services) & **Aichi Target – 19** (TK & IPLCs).



The Way Forward

- Changes in ecosystem services under different development and **climate change scenarios should be assessed.**
- Further research on **species identifications (taxonomic gaps), pattern of abundance, stock estimation and collection impact** of the economically important fungus species is encouraged,
- **Setting standards on how to harvest mushrooms** in a sustainable way could be a better option to generate a moderate income for people who traditionally use this uncommon biological resource.
- **Fungal conservation strategies** should be developed to support policy makers and stakeholders working on and interested in, climate change responses and policy integration,



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and all of you for your gracious patience
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