دکتر عبدالحسن کاظمی

PhD و فلوشیپ

فرهنگستان علوم پزشکي جمهوري اسلامي ايران

استاد دانشکده پزشکی دانشگاه علوم پزشکی تبریز

Prof. A. Kazemi (MSc, MSPH, PHD & Fellowship). School of Medicine. Tabriz Uni. of Med. SCI

Mycetismus

in

Iran

Prof. Abdolhassan Kazemi (Fellowship & PHD). School of Medicine. Tabriz Uni. of Med. SCI

قارچ؛ این پروتئین چه وقت مرگبار می شود؟

IRNA INFOGRAPHIC

علل مسمومیت های اخیر

- ۱- شرایط جوی وبارندگی‌ها
- ۲- رویش قارچ‌های خودرو
- ۳- علاقه مردم به مصرف غذاهای گیاهی
- ۴- جمع آوری و فروش آن ها به صورت فله

علائم مسمومیت

- تهوع
- استفراغ و اسهال
- درد عضلانی

عوارض

- اختلالات شدید کبدی

راه های پیشگیری

۱. عدم استفاده قارچ های خودرو محلی و کوهی

۲. عدم خرید قارچ‌های فله ای

۳. عدم مصرف قارچ به صورت خام و به مقدار زیاد

● مصرف قارچ های مجاز خوراکی تولیدی در گلخانه ها و پرورشی

مدت باقی ماندن سم قارچ

۷۰ سال

راهکار درمانی

۱- پرهیز از خوددرمانی

۲- مراجعه فوری به مراکز درمانی تخصصی سم شناسی بالینی و مسمومیت ها

۳- بستری تا ۲۴ ساعت در مراکز درمانی تا بهبودی کامل

تشخیص قارچ سمی از قارچ خوراکی

بر اساس ظاهر: ناممکن — فقط در لابراتوار

سال ۹۷ در ایران

مسموم: بیش از یک هزار نفر در ۵ استان — فوت شده: ۱۵ نفر

در دنیا

مسمومیت قارچی: متداول — مبتلایان: سالانه ۸ تا ۱۰ هزار نفر

گونه های خودرو در ایران

- ۲۰۰۰ نوع
- ۵۰ گونه سمی
- ۴ تا ۶ گونه مرگبار

منبع: ایرنا

۴۸ ۵۳

IRNA 1934

Date & Time: 1398/01/24 - 07:45 عکس از: ایرنا

Defying Death Caps

دانشگاه علوم پزشکی تبریز

مرکز مدیریت حوادث و فوریت های پزشکی

برنامه زمان بندی کارگاه آموزشی تشخیص ودرمان مسمومیت خوراکی با قارچ های کلاهکدار سمی

تاریخ 1397/3/9

ردیف	عناوین	مدت زمان	مدرس
1	تلاوت قران مجید و سرود	9:00 تا 9:10	جناب آقای حسین یاوری
2	تعاریف مسمومیت خوراکی با قارچ های کلاهکدار سمی (Mycetismus)	9:10 تا 9:30	جناب آقای دکتر عبدالحسن کاظمی
3	عوامل اتیولوژیک	9:30 تا 10:00	جناب آقای دکتر عبدالحسن کاظمی
4	پاتوژنز Toxic mushroom	10:00 تا 10:30	جناب آقای دکتر عبدالحسن کاظمی
5	اپیدمیولوژی	10:30تا 11:00	جناب آقای دکتر عبدالحسن کاظمی
	استراحت	11:00 تا 11:20	
6	علایم بالینی مسمومیت	11:20تا 12:05	جناب آقای دکتر فرزاد رحمانی
7	درمان و follow up	12:05 تا12:40	جناب آقای دکتر فرزاد رحمانی

From Magic to Science:

A journey through Latin American Medical Mycology

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This is an updated (2005) version of the Oratio delivered by the author at the 2000 ISHAM Congress (Buenos Aires, Argentina). A written version was published in Medical Mycology 38, Supplement 1, 1-8, 2000.
http://taylorandfrancis.metapress.com/app/home/contribution.asp?wasp=9c59kcwymk7rpj5g9j4k&referrer=parent&backto=issue,1,35;journal,32,37;linkingpublicationresults,1:101351,1

Mayan culture: Stone mushrooms
(Guatemala and El Salvador)
A.- Last classic period, around 900 AD
B.- Last pre-classic period, 500BC to 200 AD

A B

Holom ocox: mushroom head

Fungi in the pre-Hispanic world

The start of Latin America's love story with fungi may be rightly placed at pre-Hispanic times. Sacred mushrooms played a role in the life of Meso-American people (Mayan, Teotihuacan and Aztecs), from the Mexico Valley to the isthmus of Tehuantepec [1].

[1] Wasson RG. Les champignons dans l'archéologie méso-américaine. Archives du Muséum National d'Histoire Naturelle 1958; VI, 3: 101-122.

Teotihuacan III period, 300-600 AD
Fresco at Tepantlita:
Soul arriving at recreation fields of Paradise

Teonanacatl: flesh of Gods, mushroom of Gods

We can discern the influence of mushrooms in the pre-Columbian world through the Teotihuacan and Aztec frescoes [2]. In them, some elements have been identified as mushrooms as they show their most characteristic features, namely, stipe and pileus.

[2] Knautt L. The teonanacatl – In pre-Conquest account and today. Estudios de Cultura Nahuatl 1962; 3: 263-275.

The natives saw hallucinations provoked by mushrooms as a source of divine revelations...

"In the religious festivities, the lords gathered to eat woodland mushrooms, which contain that which confuses the mind, as if they were intoxicating drinks....they took these hallucinations as divine notices, revelations of the future, and augury of things to come..."

Durán and Tezozomoc (16th century) on Moctezuma's coronation

Wasson RG. Les premières sources. Archives du Muséum National d'Histoire Naturelle 1958; VI, 1: 15-44.

...but the Conquerors were not as open-minded

"They had another drunkenness which made them more cruel, which was of some small mushrooms...They called them teonanacatl, which means flesh of God (the demon they adored) and in that manner, with that bitter food, their cruel god held communion with them..."

Toribio de Benavente

MASHROOM

AGARICALES

1- AGARICUS

-A. BISPRUS

(BRUNNESCENS)

-A. RODMANI

-A. CAMPESTRIS

-A. SILVATICUS

-A. PLACOMYCES

AMANITACEAE

BOLETACEAE

RUSSULACEAE

R. LACTARIUS

COPRINACEAE

C. COMATUS (SHAPPY MASSE)

VOLVARIELLA

- V. volvacea

LENTINUS

-L. edeodes

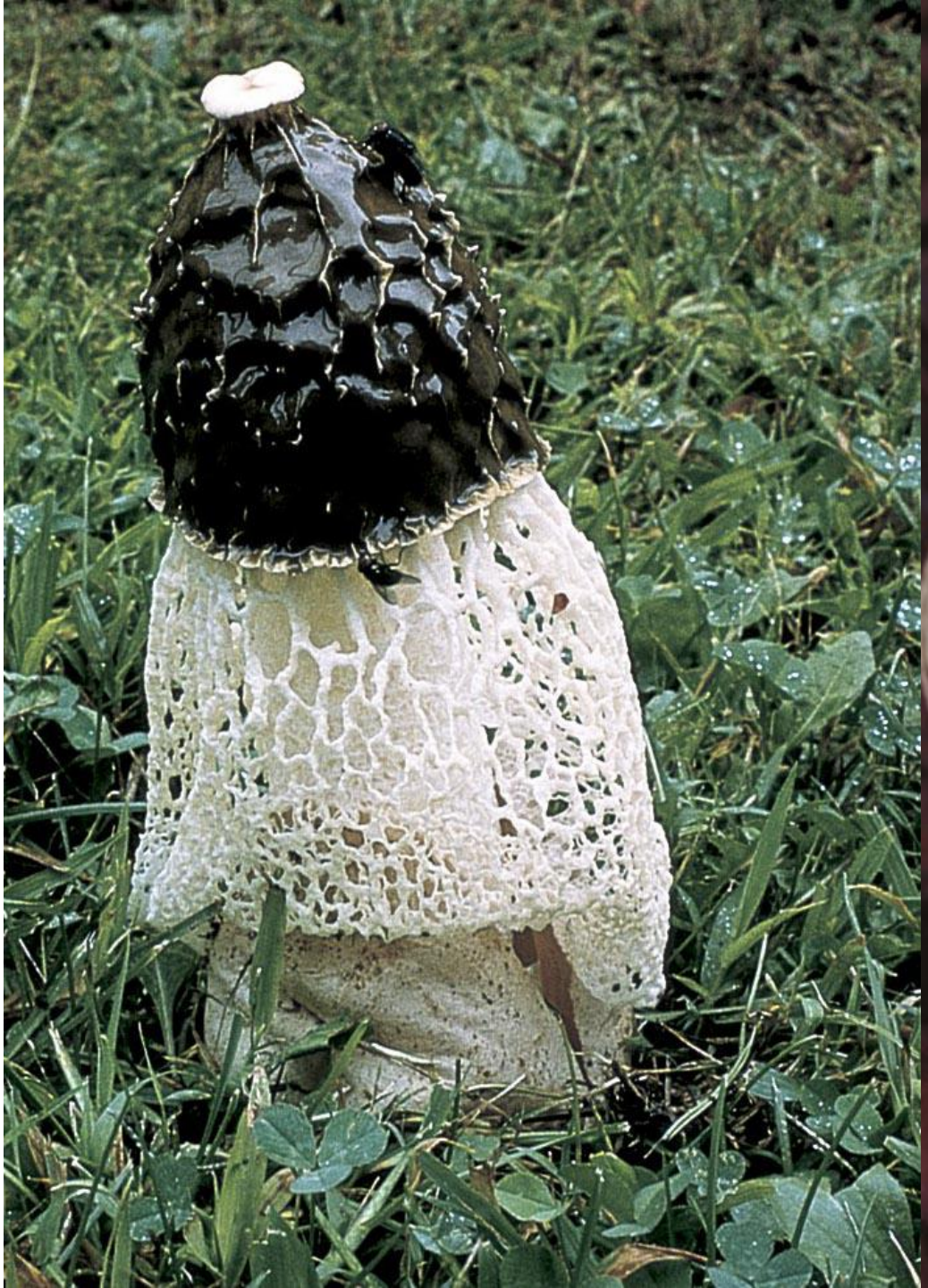
Stinkhorn

- **Felipe has already done an excellent post on this strange fungus. It is of the family Clatraceae and is one of a group of fungi called Stinkhorns.**
  They come in many shapes and colours,including white geodesic cages called basket fungi,and netted stinkhorns which are fungi,with skirts of fine netted material.
  This particular one,Clathrus archeri,the Octopus Stinkhorn,is particularly nasty.It is around 10cms tall,and smells like the worst kind of excrement.It is totally disgusting.
  I was called out to Southwell school in Hamilton today,where they had had a serious plague. The flower beds around the school were all full of them.
  The smell in the school was unbearable even with all the windows closed.When they collected them,they filled two fourty-four gallon drums!
  Stinkhorns are the fruiting bodies that sprout up from underground rhizomes,grown from spores.
  It is basically a fancy puffball,which swells,splits,and grows tentacles.
  New spores are deposited on the sticky arms of the fungi,which are spread by flies attracted to the smell of decay.
  Apparently,these can be eaten when in the unpuffed 'egg' stage...I can't imagine who by!

Identification
These distinctive mushrooms have a single, unbranched, erect stalk, sometimes gaudily colored, leading to Linnaeus aptly placing them in a genus he called *Phallus* (which has since been split into additional unsavory genera). The stalk is slimy, especially toward the tip, where the spores are concentrated. And the entire mushroom hatches from an "egg," which, unlike a puffball, reveals layers of slime cut open.

Stinkhorn

Octopus stinkhorn



Stinkhorn is technically not a plant

This Stink Horn fungus was found mid March under a clump of palms. A saprophytic (parasitic) fungus, it emits an odour that attracts flies that visit the messy decaying flesh, subsequently helping to disperse the spores.

stinkhorn

- **Common name:** Stinkhorn fungi
- **Botanical name:** *Aseroe rubra, Phallus rubicundus* and others
- **General description:** These fungi produce spore slime, which has an intense smell of rotting meat or sewage. They are very common on wood or bark-chip mulch in gardens, and on deep litter on the rainforest floor. There are a number of differently shaped species, but all are readily recognisable by the smell of the spore slime.
- **Symptoms:** Cases of human consumption are not known, but the smell is attractive to dogs, and possibly cats. Deaths of small dogs have occurred. The toxins are unknown, but are thought to develop during the enzymatic liquefaction of the spore slime. They are generally gastro-irritants.
- **Toxicity category** 2**Warning:** Seek urgent medical attention for any ingestion.

The stinkhorn fungi is so called because it releases a foul smell. The purpose is to attract flies. The flies land on the slime, pick up the fungi's spores on their feet and then carry them off to new locations. In this way the fungi can reproduce.


Go Foraging with the "Wildman"!
www.wildmanstevebrill.com
Eat Edible Wild Mushrooms!
Parasol Mushroom
Oyster Mushrooms
Skull-shaped Puffball
Fairy Ring Mushrooms
Black Trumpets
Yellow Morel
Chicken Mushroom
Black-staining Polypore
King Bolete
Shaggy Manes
Chestnut Bolete
Prince Mushrooms

Mycophagy

- Mycophagy – eating of fungi (as mushrooms)
  - Edible wild and cultivated mushrooms can taste great; nutritious
  - Edible wild and cultivated mushrooms provide variety to the diet
  - Edible wild mushrooms are usually free for the picking.

MYCETISIMUS

PHALLOIDES SYNDROME

ORELLANUS SYNDROME

GYROMITRA SYNDROME

MUSCARINE SYNDROME

PANTHERINA SYNDROME

PSILOSYBIN SYNDROME

COPRINUS SYNDROME

PAXILLUS SYNDROME

GASTRO INTESTINAL SYNDROME

TOADSTOOL (TOIXIC MASHROOM)

AMANITACEAE

A. PHALLOIDES (DEATH CAP)
A. VIROSA (DESTRROYING ANGEL)
A. VERNA (DEATH ANGEL)
A. MUSCARIA (FLY AGARIC)
A. PANTHERINA
A. BISPORIGERA
A. OCREATA
A. SUBALLIACAE
A. TENUIFOLIA
A. GEMMATA
A. COKERI
A. COTHURNATA

INOCYBE

I. FASTIGIATA
I. GEOPHYLLA
I. LILACINA
I. PATUOILLARDI
I. PURICA
I. RIMOSUS

STROPHARIS

GALERIA

G. AUTUMNALUIS
G. MARGINATA
G. VENENATA

GYROMITRA

G. ESCULENTA
G. GIGAS
G. AMBIGUA
G. CAROLINIANA
G. BRUNNEA
G. FASTIGIATA

CORTINARIUS

C. ORELLANUS
C. SPECIOSISSINUS
C. SPLENDOMA
C. GENTILIS
CONOCYBE SP.
GYMNOPILUS SP.
PANAEOLUS SP.
PAXINA SP.
SARCOSPHAERA SP.

BOLETUS

B. CALOPUS
B. LURIDUS
B. PULCHERRIMUS
B. SATANAS

CLITOCYBE

C. CERRUSATA
C. DEALBATA
C. ILLUDENS
C. RIUULOSA
C. CLAVIPES

PSILOCYBE

P. CUBENSIS
P. CAERULESCENS
P. CYANESCENS
P. BAEOCYSTIS
P. FIMENTARIA
P. MEXICANA
P. SEMILANCEATA
P. SILVATICA

میسه تیسموس Mycetismus

مسمومیت غذایي ناشي از مصرف قارچ هاي کلاهکدار سمي به جاي قارچهاي کلاهکدار خوراکي (میسه تیسموس Mycetismus) ناشي از اشتباه در شناسایي قارچهاي کلاهکدار یا گوشتي خودرو در دشت ها، مزارع و کوهپایه ها بوسیله افراد بومي در روستاها و حومه شهرهاي کوچك است.

این اشتباه به علت تشابهات فراوان در مورفولوژي قارچ هاي کلاهکدار سمي و قارچهاي کلاهکدار خوراکي بوده و میسه تیسموس در ایران منجر به مرگ به 30-50 مورد سالیانه بالغ مي گردد.

شناسايي قارچ هاي كلاهكدار سمي

شناسايي قارچ هاي كلاهكدار سمي با توجه به شكل و رنگ و اندازه كلاهك، پايه، وجود يا عدم وجود آنولوس و ولوا در ساختمان قارچ و شكل آنها در صورت وجود، شكل، اندازه و رنگ اسپورهاي ورقه هاي ژيل و... امكانپذير است.

ميسه تيسموس در ايران بصورت سندرم هاي باليني:

فالوئيدي PHALLOIDES، موسكاريني MUSCARINE،

جيروميتري GYROMITRA، اورلاني ORELLANUS،

پانتريني PANTHERINA، پسيلوسيبيني PSILOSYBIN،

كوپرينوسي COPRINUS، پاكسيلوسي PAXILLUS و معدي –

روده اي GASTRO INTESTINAL تظاهر مي كند كه بيشترين

سندرم هاي باليني گزارش شده از ايران، سندرم هاي فالوئيدي و

موسكاريني با قارچهاي *A. muscaria , (Death angel)*

A.verna و *A phalloides (Death cup).* بوده است.

بيشترين فراواني ميسه تيسموس از مركز جمعيتي كوهپايه هاي زاگرس و البرز و از ميان روستائيان و ساكنان حومه شهرهاي كوچك گزارش مي شود.

از نظر زماني اين موارد از اواسط فصل بهار تا اواخر پاييز را در بر ميگيرند.

مسموميت معمولا بصورت خانوادگي با صرف غذاي مشترك اتفاق افتاده و خردسالان نسبت به سموم متنوع موجود در انواع قارچ هاي كلاهكدار سمي حساس ترند.

به علت وقوع ميسه تيسموس در نواحي دور از مراكز درماني مجهز، متاسفانه مسمومين پس از بروز علايم حاد مسموميت و موقعي به مركز درماني مجهز اعزام مي گردند كه امكان انجام اقدامات درماني اوليه و نجات بخش سپري شده است.

سميت سموم موثره بعضي از اين قارچ ها بسيار زياد بوده و در موارد عديده اي، مرگ طيور و ماكيان در محل بروز مسموميت به علت خوردن بقاياي استفراغ مسمومين نيز گزارش شده است.

محتمل است كه تعداد موارد بروز ميسه تيسموس در ايران بيش از تعداد موارد گزارش شده باشد.

لزوم ارائه آموزش به جمعيت هدف بويژه در مناطق روستايي از طريق شبكه هاي بهداشتي كاملا محسوس است.

سموم قارچي

1- Alpha-amanitin آلفا آمانیتین): کشنده بوده و مشکلات کبدی 6 تا 24 ساعت پس از مصرف شروع می شود.

2- Phallotoxin فالوتوکسین): باعث ناراحتی معده و روده می باشد.

3- Orellanineاورلانین): نارسایی کلیه در طی سه هفته پس از مصرف آن ایجاد می شود.

4- Muscarineموسکارین): می تواند باعث نارسایی تنفسی شود و حتی گاهی مرگبار می باشد.

5- Gyromitrinژیرومیترین): کشنده و باعث مشکلات عصبی، اختلالات گوارشي و تخریب گلبولهای قرمز میشود.

6- Coprineکوپرین): اگر با الکل مصرف شود، بیماری زا می شود.

7- Ibotenic acid ایبوتنیک اسید): عوارض عصبی و توهم زا ایجاد می کند.

8- psilocybinو psilocin پسی لوسین و پسی لوسیبین): توهم زا می باشد.

9- Arabitol آرابیتول): در برخی افراد باعث ناراحتی گوارشی می شود.

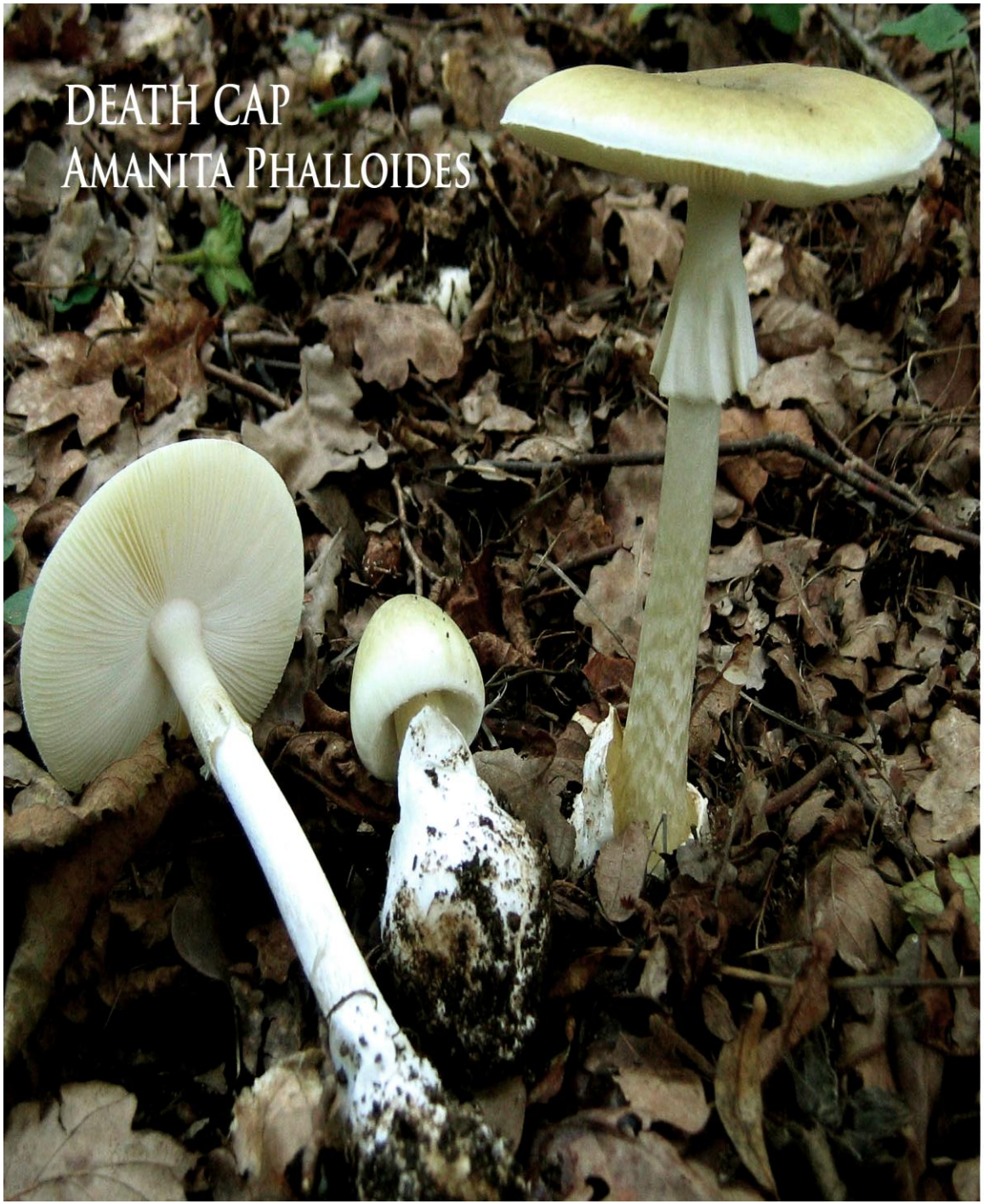
10- Ergotamine ارگوتامین): بر سیستم عروقی اثر کرده و می تواند منجر به از دست دادن اندام ها و مرگ شود.

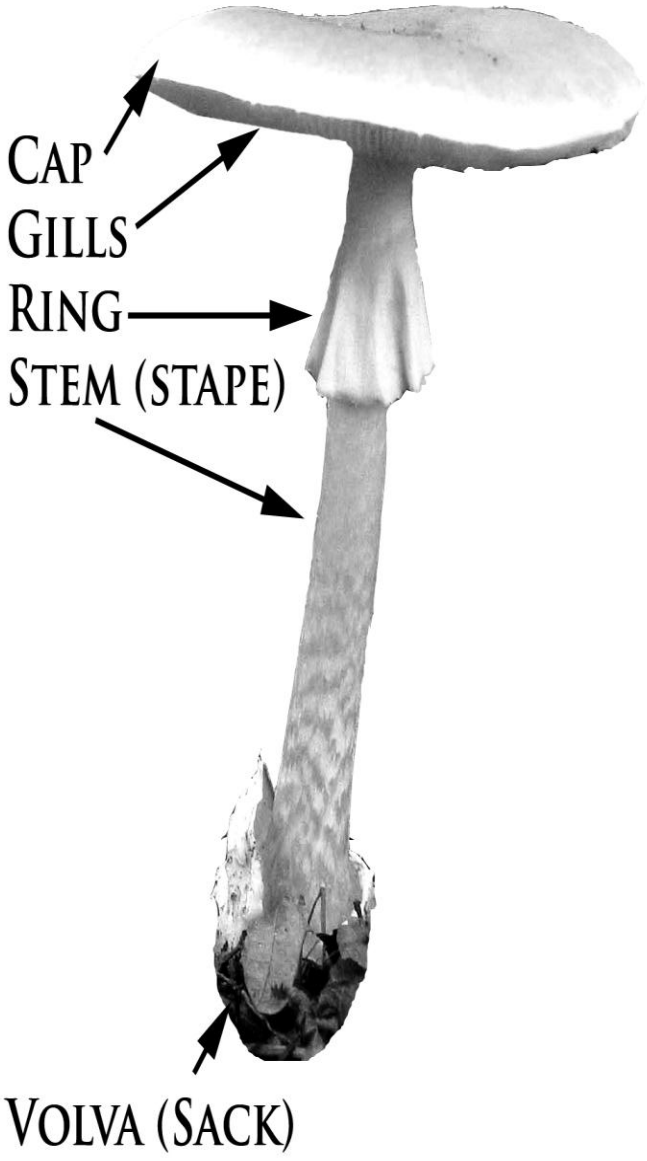
AMANITA

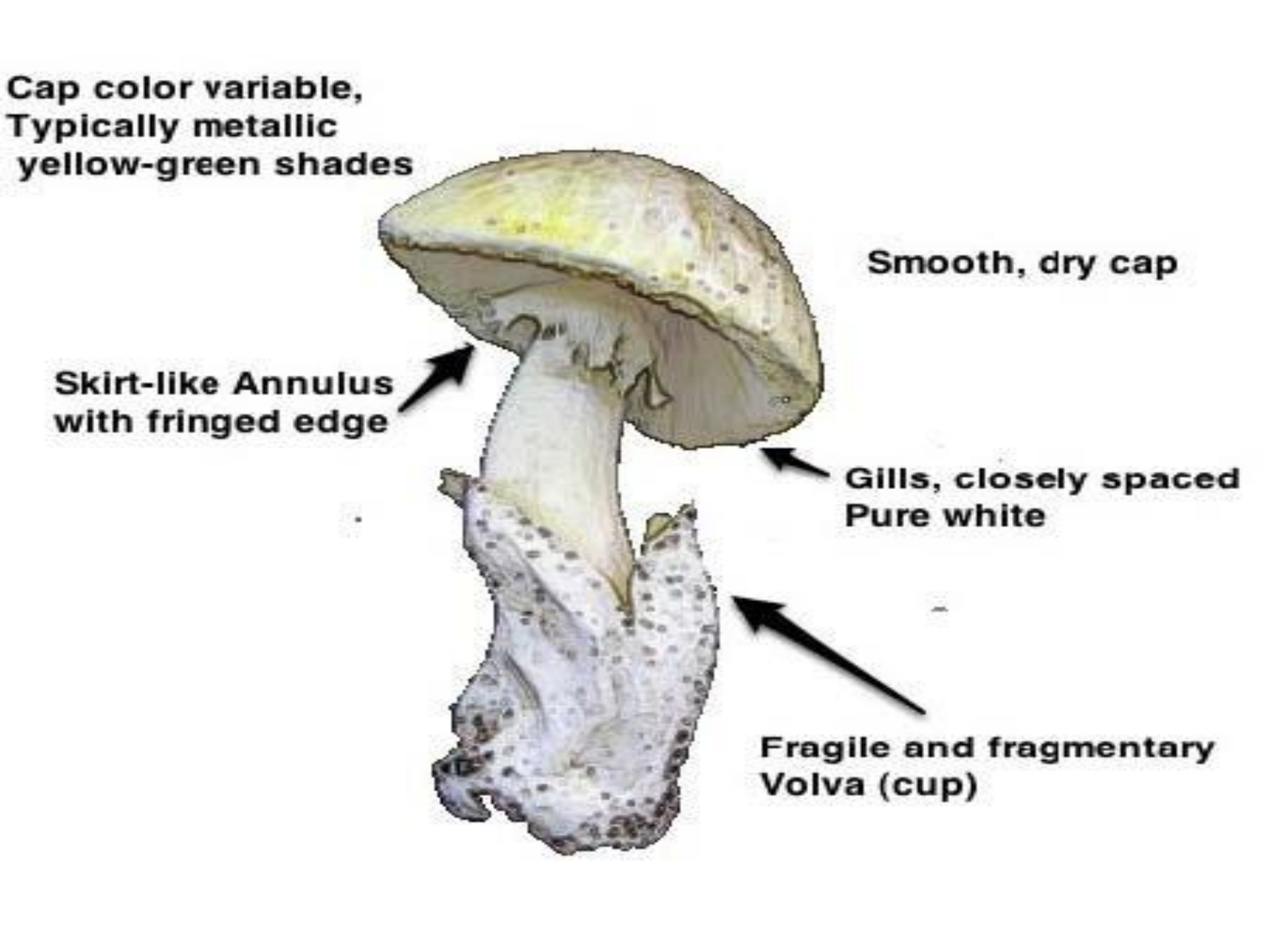
- **There are roughly 600 species of amanitas worldwide. Five percent of the world's fatalities from mushrooms are in this group.**

- **50 percent of these are from mushrooms in the Amanita phalloides group, which includes Amanita virosa (bisporigera), Amanita verna and allies.**

Amanita hemibapha- edible


DEATH CAP
AMANITA PHALLOIDES


CAP
GILLS
RING
STEM (STAPE)
VOLVA (SACK)


Cap color variable,
Typically metallic
yellow-green shades
Smooth, dry cap
Skirt-like Annulus
with fringed edge
Gills, closely spaced
Pure white
Fragile and fragmentary
Volva (cup)

A-340-1 Amanita vaginata.jpg

Image JPEG

A-340-2 Amanita vaginata.jpg

Image JPEG

A-340-3 Amanita vaginata.jpg

Image JPEG

A-340-4 Amanita vaginata.jpg

Image JPEG

A-40-24 Amanita phalloides.jpg

Image JPEG

A-40-25 Amanita phalloides.jpg

Image JPEG

Amanita phalloides

- Import
- Greenish, yellow, tan cap, palest at margin
- Smooth margin
- White ring
- White volval sac yellow on inner surface

Amanita polypyramis

- **Appendiculate** cap margin
- Friable partial veil
- **Radicating base**.

Amanita flavorubescens

- Yellow cap and yellow warts and fragile yellow volva
- Gills close & free or slightly attached to stem
- Tendency to **redden** like A. rubescens
- Mycorrhizal with oaks

Amanita vaginata

many species

- Grey to grey-brown cap
- Strongly striate
- **No PV** (ringless)
- **Saccate**
- Mycorrhizal with conifers and hardwoods
- Confused with A. fulva, which is tawny in color

Amanita rubescens (Eur.)

- Pink, tan or gray warts on brownish to reddish pileus
- Persistent ring
- Tendency to **redden**
- Mycorrhizal with oaks
- (Hypomyces hyalinus)

Amanita Phalloides

- Found primarily in the cool coastal regions of the west coast, but it also grows in several other regions, including the mid-Atlantic coast and in the northeast.
- Reported ingestions in the pacific Northwest, the Gulf Coast region, and even in suburban New York
- Flourish in favorable weather conditions during the fall or the rainy season.
- Toxin not destroyed by cooking or drying

Amanita phalloides

- **The "death cap"**
- one of many in the genus *Amanita*.
- Associates with broadleaf trees
- responsible for the majority of fatal mushroom poisonings worldwide.
- It is estimated that 30 grams (1 oz), or half a cap, of this mushroom is enough to kill a human

http://en.wikipedia.org/wiki/Death_cap#cite_note-benjamin211-37

Amanita phalloides (the death cap)

These mushrooms contain toxin α-amanitin.

Block the action of RNA polymerase II.

40-90% die within a few days.

A. PHALLOIDES (DEATH *CAP*)

A. PHALLOIDES (DEATH *CAP*)

Amatoxin

Amanita phalloides or A. Ocreata
Common name: Death cap

Toxic principle: alpha-amanitin

- ✓ One of the Deadliest naturally occurring compounds.
- ✓ 0.1 mg/kg can be fatal (a dose that is often present in a single mushroom).

MoA:
Interference with RNA polymerase II, which prevents DNA transcription.

Amanita VIROSA
(DISTRROYING ANGEL)

Amanita VIROSA (DISTRROYING ANGEL)

Amanita VIROSA (DISTRROYING ANGEL)

Amanita VIROSA (DISTRROYING ANGEL)

Agaricus

A. VERNA (DEATH ANGEL)

A. VERNA (DEATH ANGEL)

Smith's Amanita (Amanita smithiana)

Amanita Smithiana

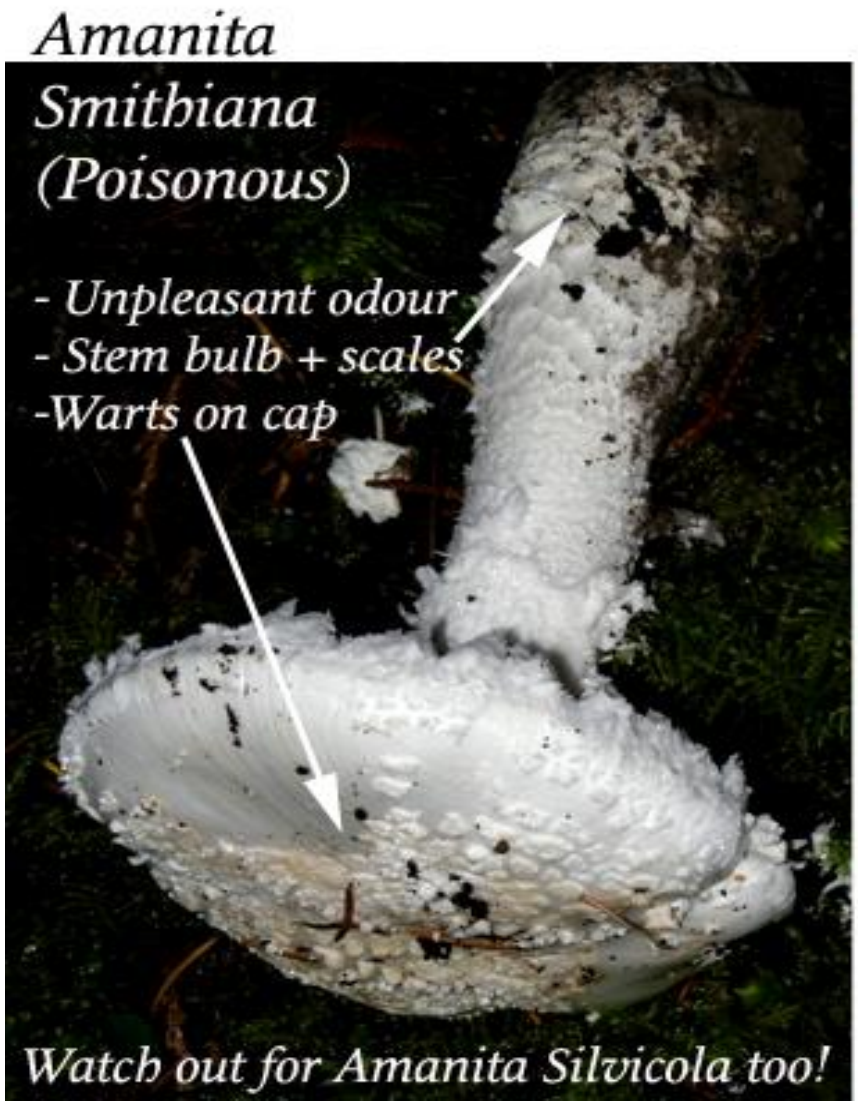
Amanita Smithiana

Amanita Smithiana

Amanita Smithiana

Amanita Smithiana

Amanita Smithiana?



Death angels, Amanita bisporigera

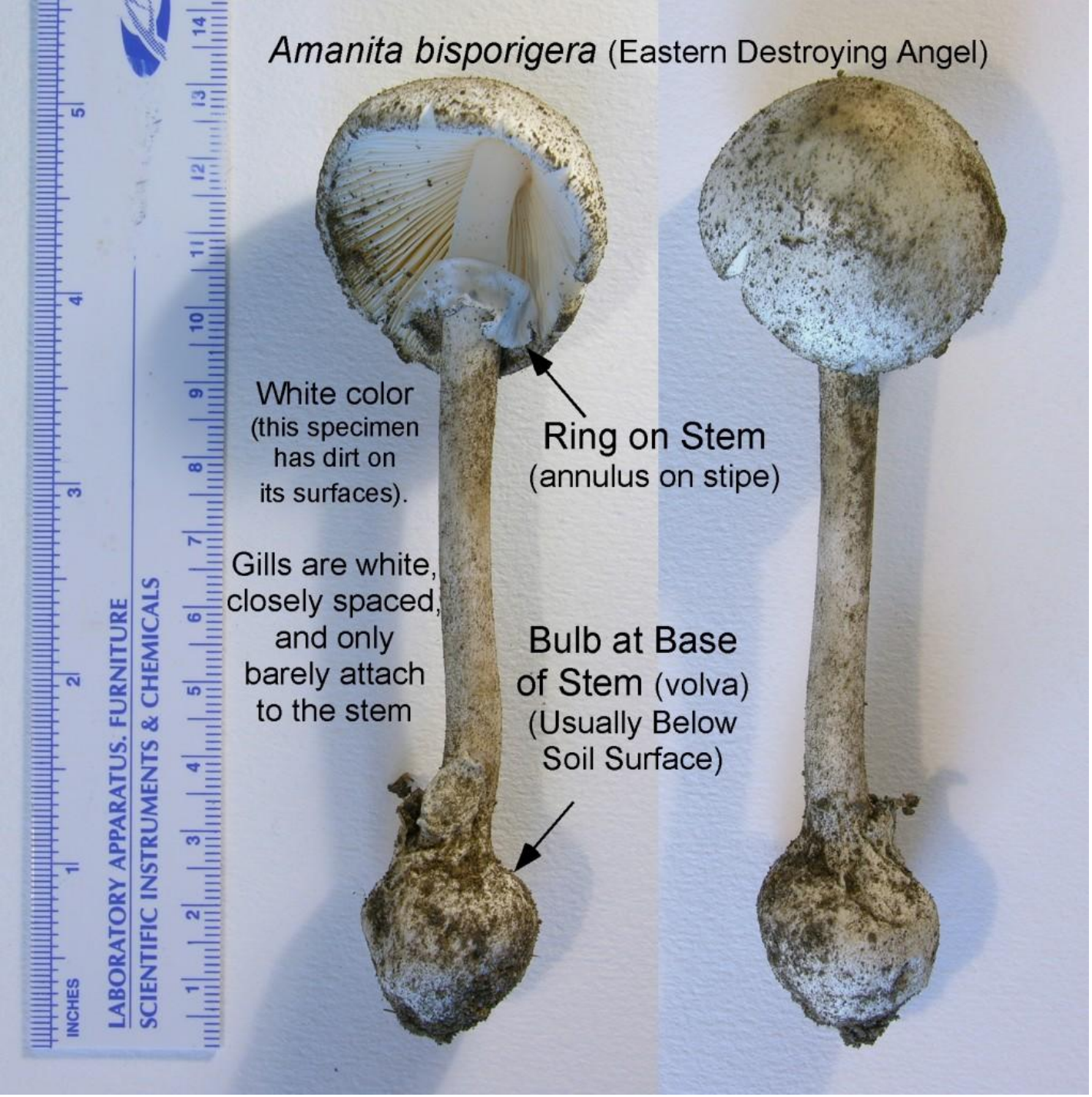
Death angels, Amanita bisporigera

Death angels, Amanita bisporigera

Amanita bisporigera

A. verna, A. virosa (Death Angel)

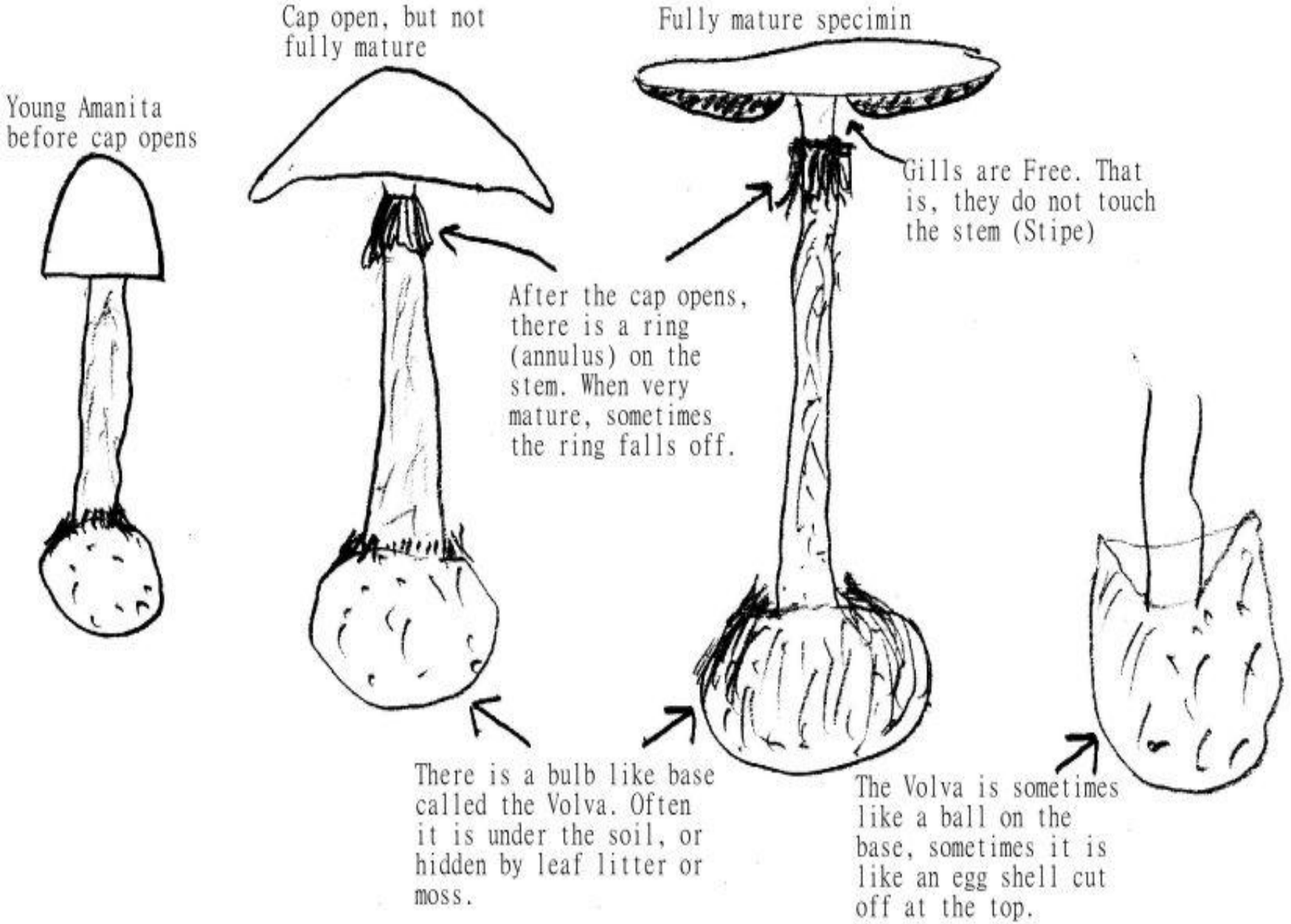
- All white, non-striate margin
- White ring
- 2-spored
- Deadly toxic
- Mycorrhizal with oaks in east, other hardwoods & conifers in west


Amanita bisporigera (Eastern Destroying Angel)
White color
(this specimen
has dirt on
its surfaces).
Ring on Stem
(annulus on stipe)
Gills are white,
closely spaced,
and only
barely attach
to the stem
Bulb at Base
of Stem (volva)
(Usually Below
Soil Surface)
LABORATORY APPARATUS. FURNITURE
SCIENTIFIC INSTRUMENTS & CHEMICALS
INCHES

Characteristics of Amanita?

- Dry caps (compared with Limacella spp.)
- Warts or patches on pileus
- Partial veil that produces an annulus
- Universal veil that forms a saccate bulb
- Pale, free gills
- White to pale spore print

Amanita bisporigera, Amanita ocreata, Amanita verna, Amanita phalloides and Amanita virosa



Toxic Mashroom Sites

Amanita Slides

http://www.fungikingdom.net/mycology-and-photography/amanita/there-are-roughly-600-speci.html

EDIBLE MUSHROOMS & POISONOUS LOOK-A-LIKES

http://www.fungikingdom.net/mycology-and-photography/edible-mushrooms--poisonous/index.html

POISON CONTROL

http://www.fungikingdom.net/articles-by-bill-bakaitis/poison-control--the-interne.html

Amanita keys

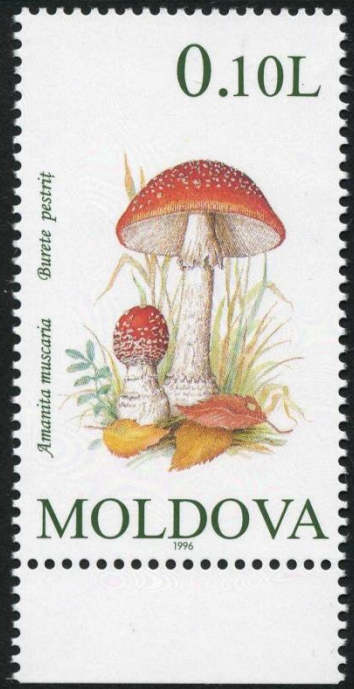
http://www.fungikingdom.net/articles-by-bill-bakaitis/amanita-keys.html


ANGOLA
300 NKz
Tricholoma georgii (Clus.: Fr) Quélet
JOSÉ PROJECTO des.
INCM Imp. 93


ANGOLA
500 NKz
Amanita phalloides (Vaill.: Fr) Secr.
JOSÉ PROJECTO des.
INCM Imp. 93


ANGOLA
600 NKz
Amanita vaginata (Bull.: Fr) Vitt
JOSÉ PROJECTO des.
INCM Imp. 93


ANGOLA
1000 NKz
Macrolepiota procera (Scop.: Fr) Sing
JOSÉ PROJECTO des.
INCM Imp. 93


0.10L
Amanita muscaria
Burete pestriț
MOLDOVA
1996


0.10L
Boletus satanas
Hrib țigănesc
MOLDOVA
1996


0.65L
Amanita phalloides
Buretele viperei
MOLDOVA
1996


1.30L
Hypholoma fasciculare
Ghebă pucioasă
MOLDOVA
1996


2.40L
Amanita virosa
Burete puturos
MOLDOVA
1996


ČESKOSLOVENSKO
30r
ČESKOSLOVENSKO
40r
ČESKOSLOVENSKO
60r
ČESKOSLOVENSKO
1,40
ČESKOSLOVENSKO
1,60

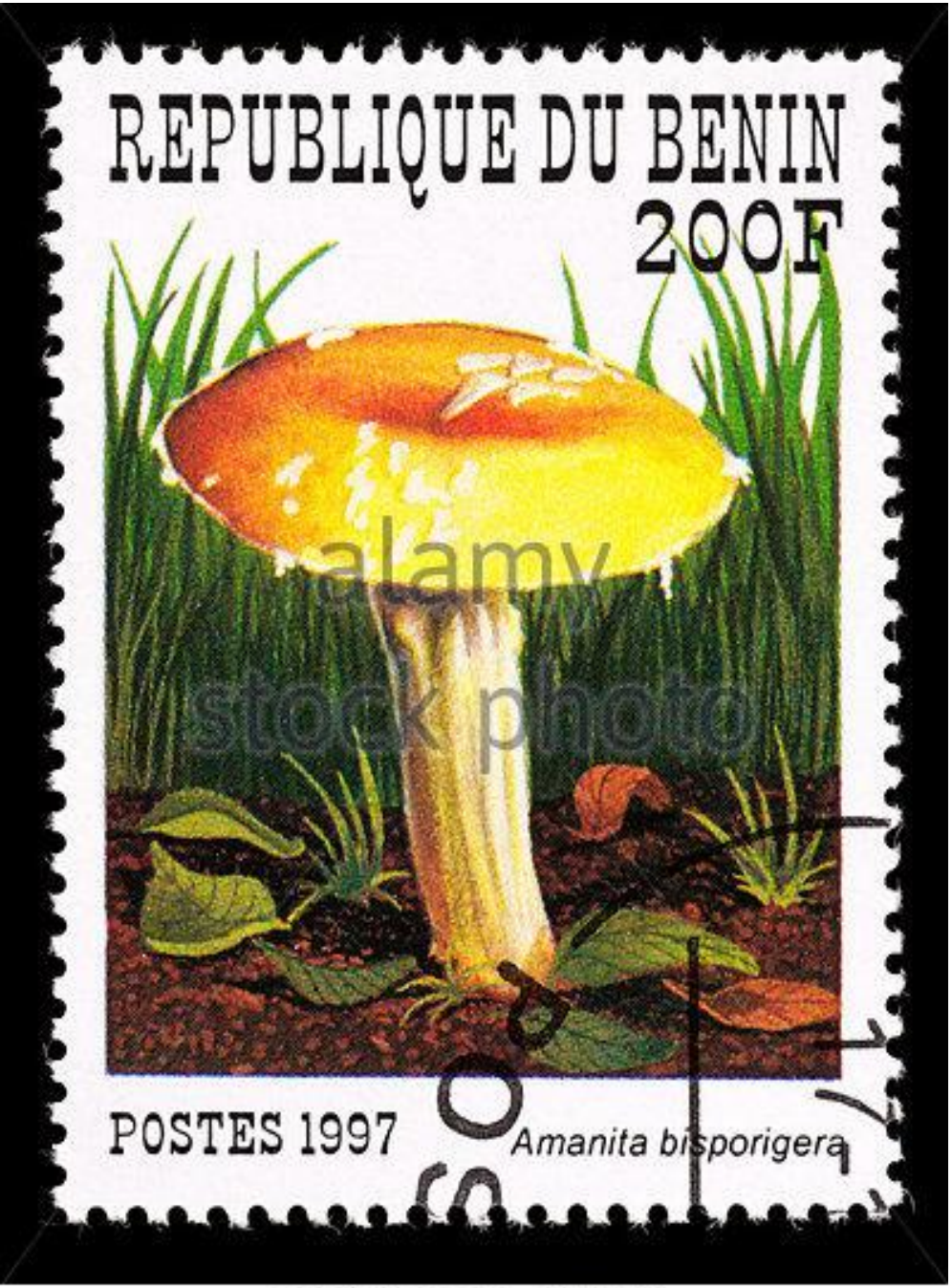

ASCENSION ISLAND
Marasmius echinosphaerus
7P
EIIR
ASCENSION ISLAND
Chlorophyllum molybdites
12P
EIIR
ASCENSION ISLAND
Leucocoprinus cepaestipes
15P
EIIR
ASCENSION ISLAND
Lycoperdon marginatum
20P
EIIR
ASCENSION ISLAND
Marasmiellus distantifolius
50P
EIIR

BELARUS
2000
BELARUS
2000
BELARUS
2000
BELARUS
1000
BELARUS
1000

REPUBLIQUE DU MALI
250 F
POSTES 1997
IMPRESSOR S.A.

REPUBLIQUE DU MALI
320 F
POSTES 1997
IMPRESSOR S.A.

REPUBLIQUE DU MALI
1060 F
POSTES 1997
IMPRESSOR S.A.



WARNING!

POISONOUS MUSHROOMS !

DON'T MAKE A DEADLY MISTAKE!

KNOW YOUR MUSHROOMS

hongos venenosos nấm độc 毒キノコ 毒蘑菇

ядовитые грибы 독성 버섯 เห็ดพิษ

North American Mycological Association

www.namyco.org

Poison Control: 800-222-1222 (US)

http://www.aapcc.org/ (US) www.capcc.ca/ (Canada)

GROWERS COMMUNICATION STRATEGY:

How to proceed in a crisis

AMSAFE safeguarding our future!

1

Phone 02 4577 6877

- If you suspect a possible crisis
- If you are experiencing difficulties that may become a wider crisis
- If you aren't coping with a crisis

2

Say nothing

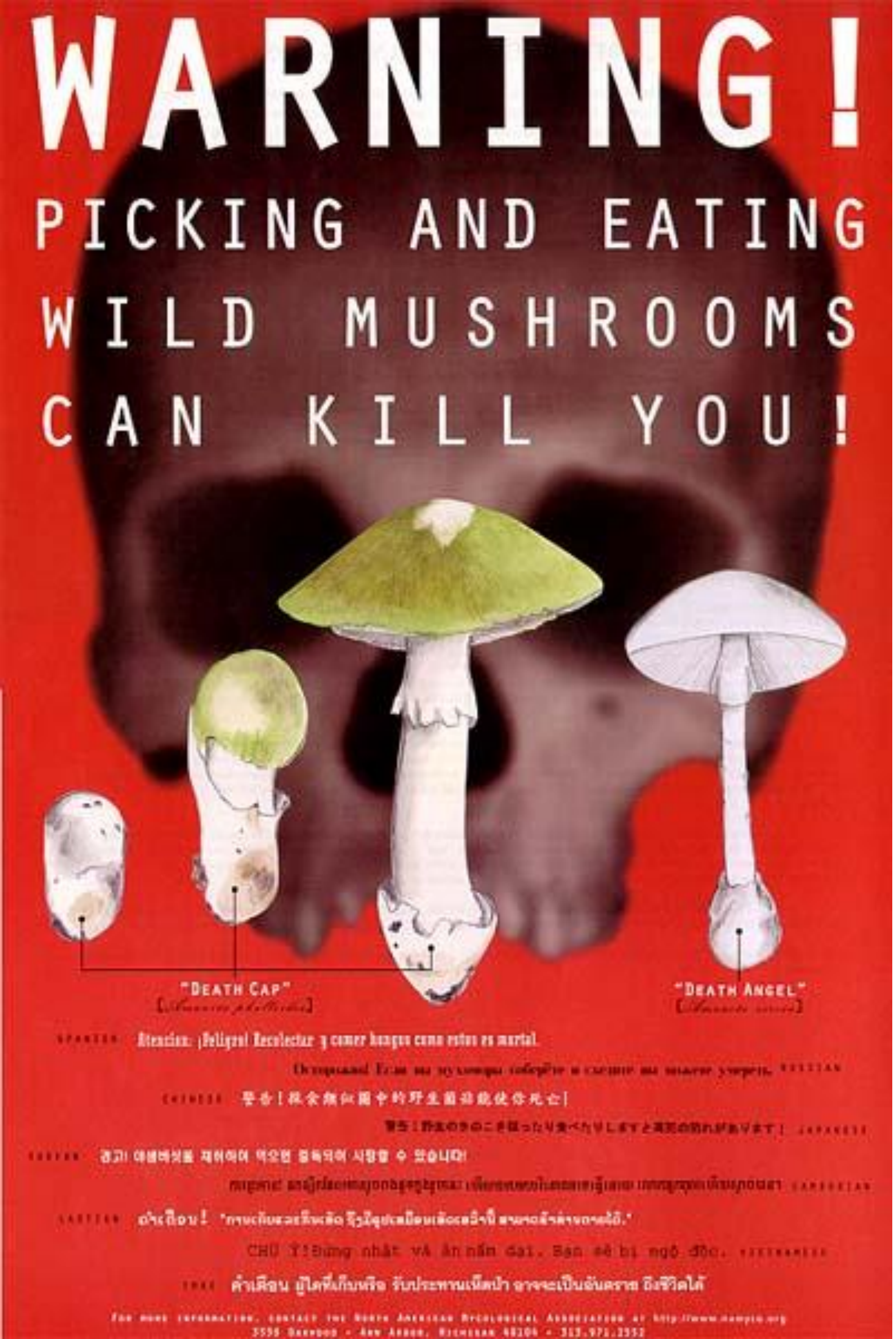
- Refer all enquiries to AMSafe
- Refer the media to AMSafe

3

Follow the leader

- Wait for AMSafe to issue you with the 'one message'

AMSAFE – protecting the assets and wellbeing of the Australian Mushroom Industry!



Foods that are toxic to dogs:

- Alcoholic beverages
- Avocado
- Chocolate (all forms)
- Citrus seeds and peels
- Coffee and caffeinated products
- Fatty foods and salt
- Garlic (in large amounts)
- Grapes and raisins
- Macadamia nuts
- Mushrooms
- Onions (all forms)
- Pits of most fruits
- Turkey skin
- Xylitol (sugar-free candies and gum)
- Yeast dough

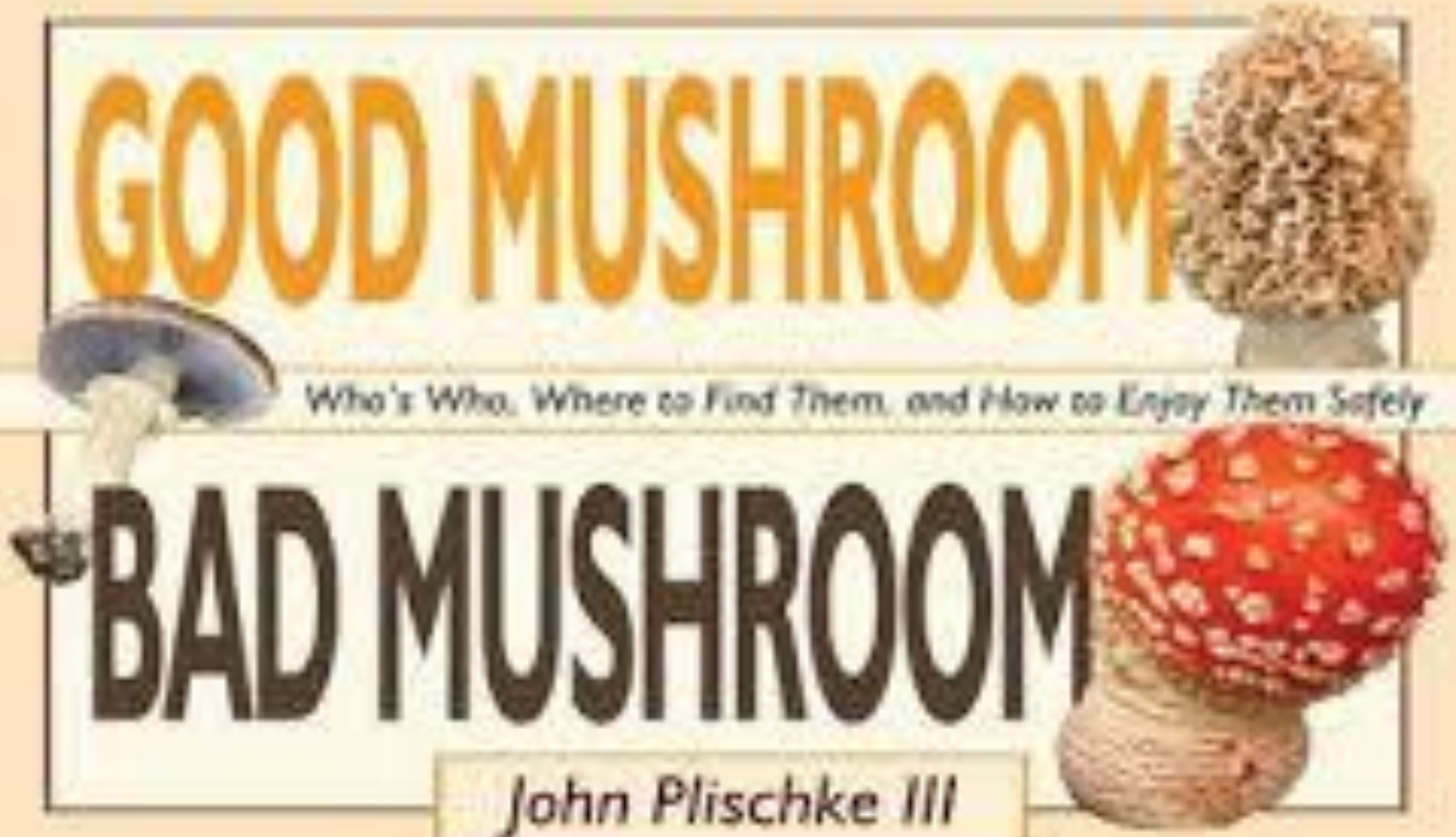
ATLANTA BOXER RESCUE

www.atlantaboxerrescue.org

All You Need to Know About the Wild Mushrooms of North America

GOOD MUSHROOM BAD MUSHROOM

Who's Who, Where to Find Them, and How to Enjoy Them Safely



John Plischke III

Warning: Bad Mushrooms

These Mushrooms are dangerous to pets and children. If ingested they can cause nausea, central nervous system damage, seizures, and liver damage. We found them in our yard (10/27/10 in Raleigh, NC) after our dog had unexplained seizures, which we believe was because of eating a mushroom. We found her unresponsive, and she spent 2 nights at NCSU Vet Hospital in critical condition. Thankfully she's recovering, but we want to warn the community to watch their yard for mushrooms that are growing here around trees.

Pennsy, Our Bernese Mountain Dog, Age 5

Contact Steve & Suzanne Miller with questions:
suzparkermiller@gmail.com
Thank you for helping us spread the word!

WARNING!

POISONOUS MUSHROOMS !

DON'T MAKE A DEADLY MISTAKE!

KNOW YOUR MUSHROOMS

hongos venenosos nấm độc 毒キノコ 毒蘑菇
ядовитые tгрибы 유독 버섯 เห็ดพิษ

North American Mycological Association
www.namyco.org

Poison Control: 800-222-1222 (US)
http://www.aapcc.org/ (US) www.capcc.ca/ (Canada)

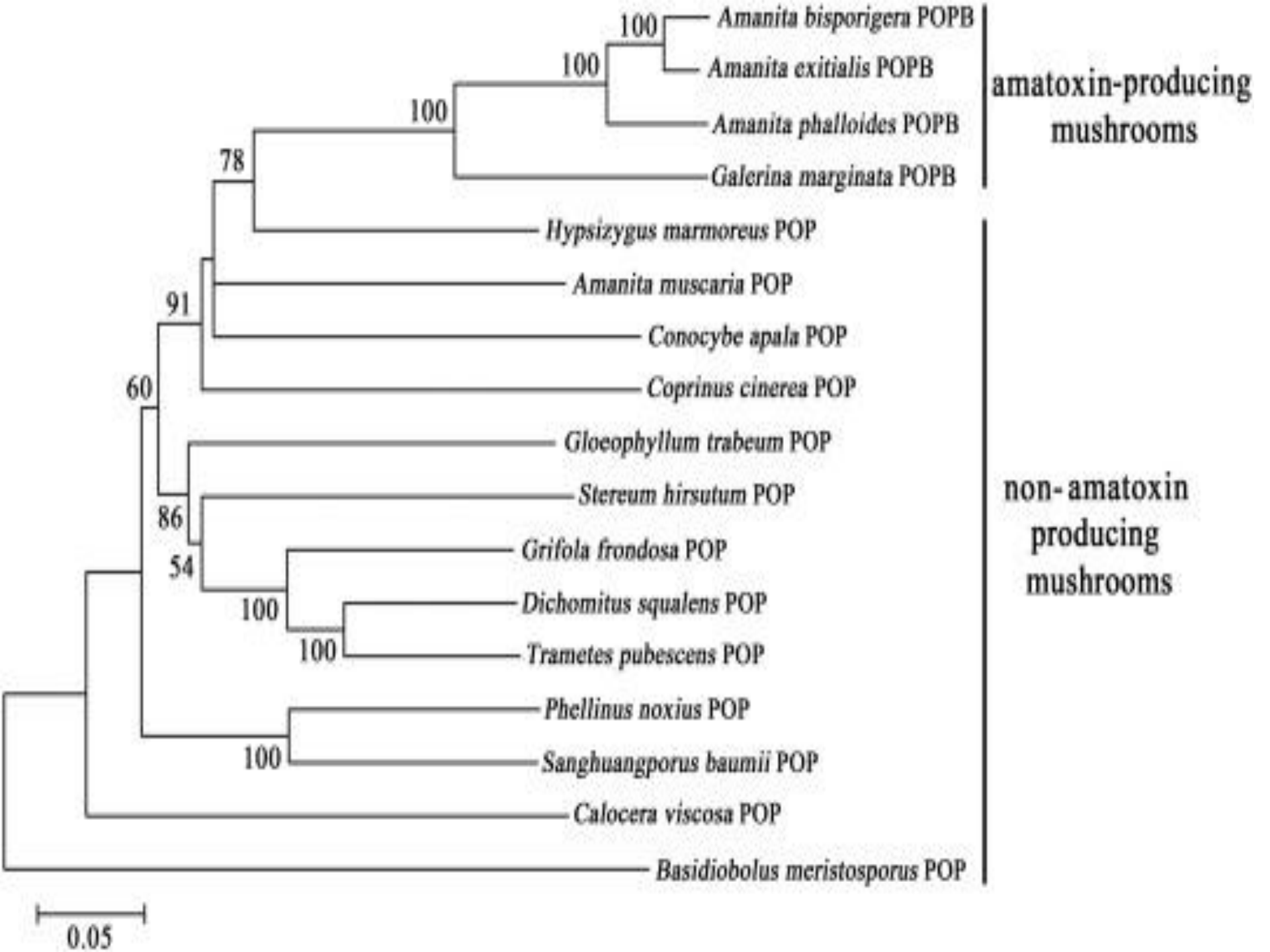
THE MOST COMMON POISONOUS MUSHROOMS

Poisonous or Edible?

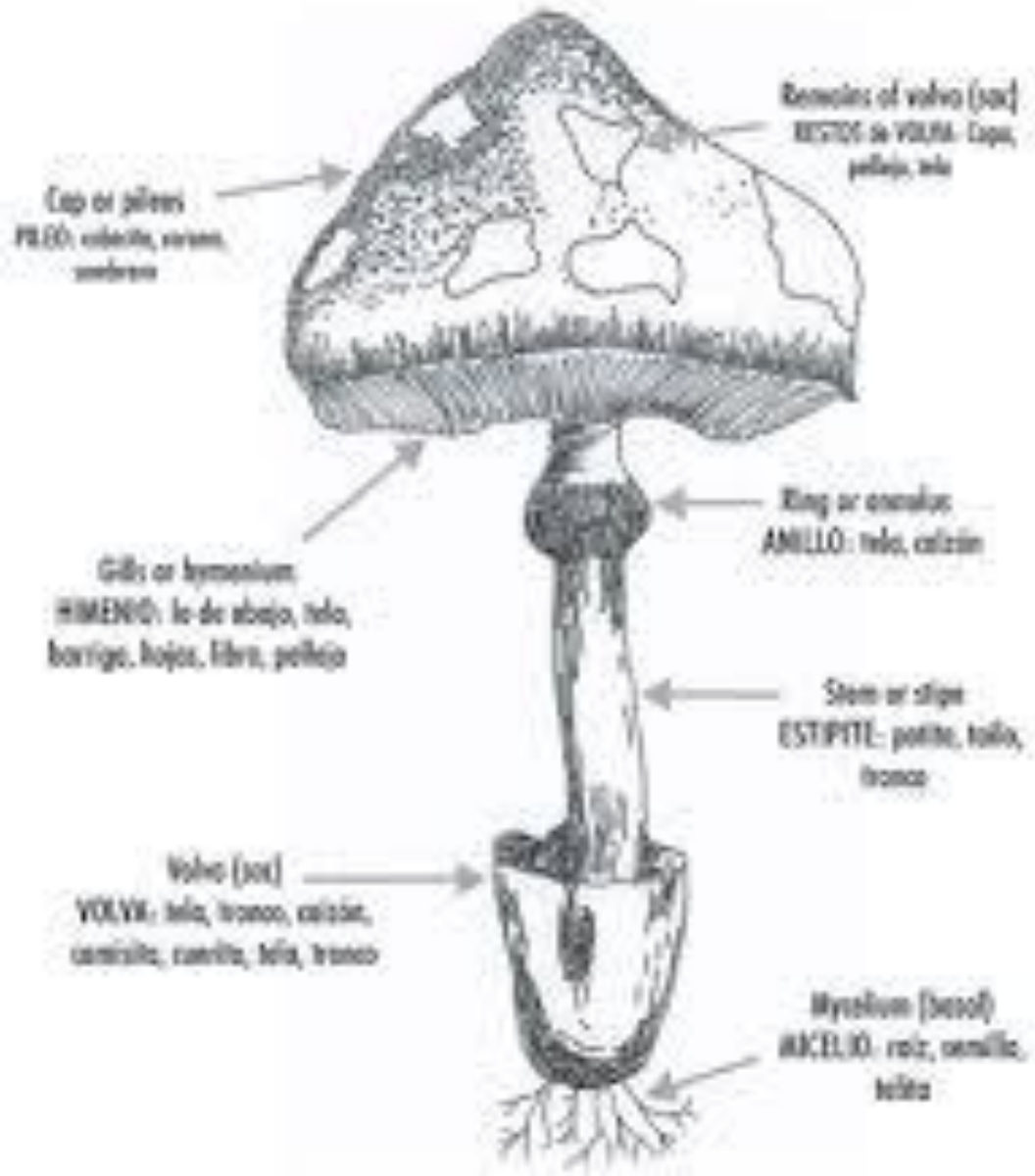
"Destroying Angel" Mushrooms

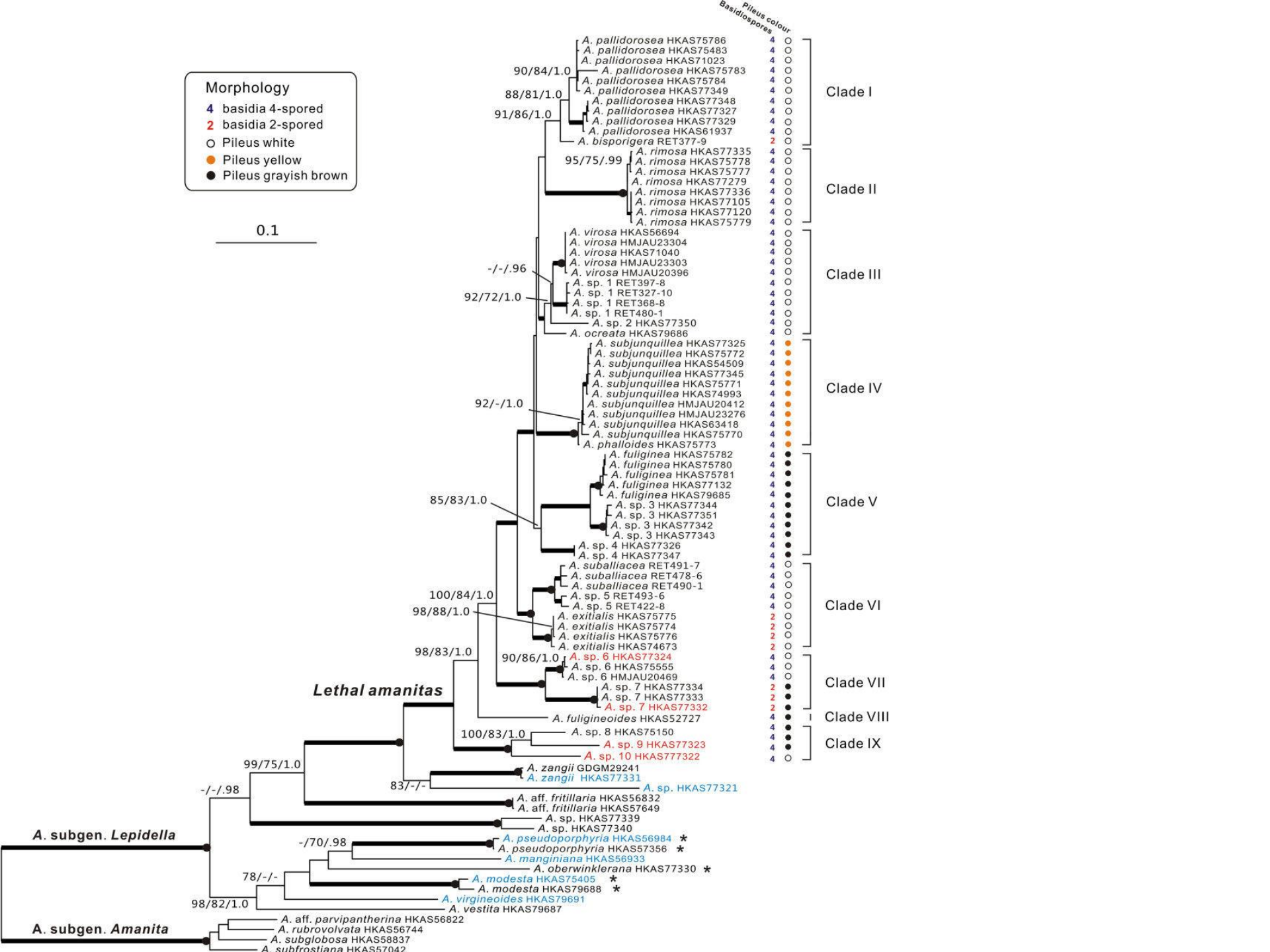
Edible Puffball Mushrooms

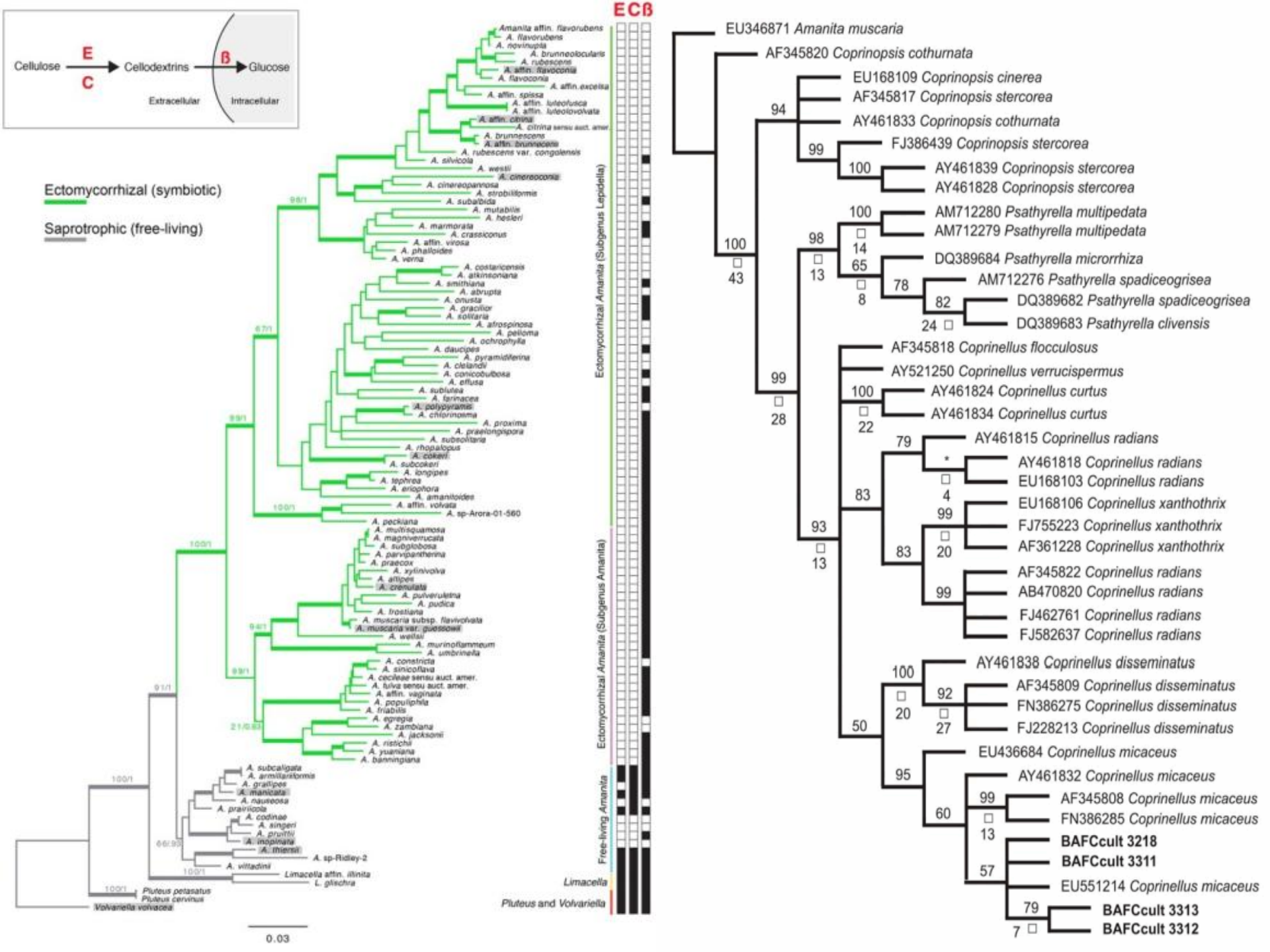

DANGER
POISON


100
Amanita bisporigera POPB
100
Amanita exitialis POPB
100
Amanita phalloides POPB
78
Galerina marginata POPB
amatoxin-producing mushrooms
Hypsizygus marmoreus POP
Amanita muscaria POP
91
Conocybe apala POP
Coprinus cinerea POP
60
Gloeophyllum trabeum POP
Stereum hirsutum POP
86
Grifola frondosa POP
54
100
Dichomitus squalens POP
100
Trametes pubescens POP
Phellinus noxius POP
100
Sanghuangporus baumii POP
Calocera viscosa POP
Basidiobolus meristosporus POP
non-amatoxin producing mushrooms
0.05

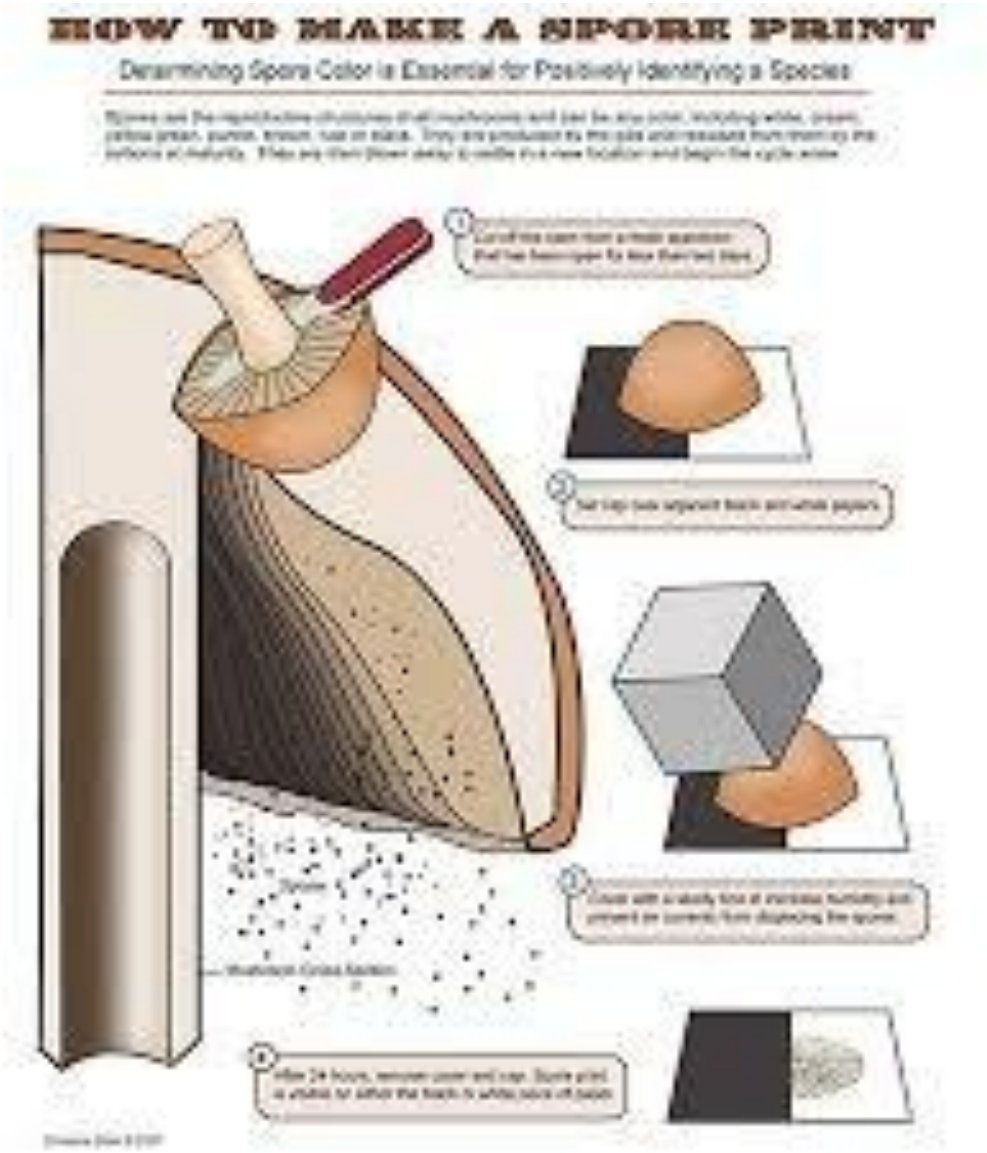
Scientific and popular names for the parts of a mushroom



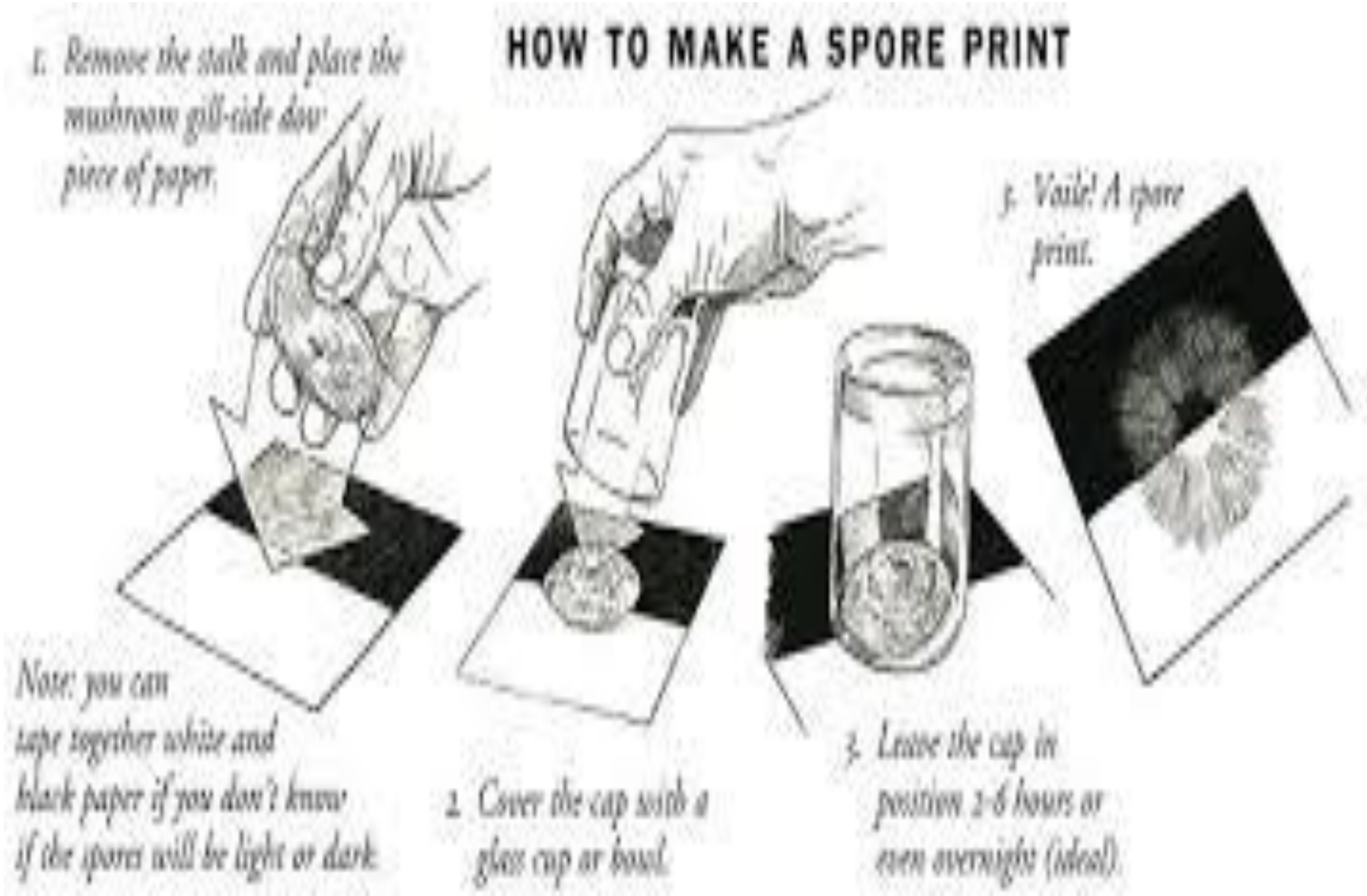

Morphology
4 basidia 4-spored
2 basidia 2-spored
Pileus white
Pileus yellow
Pileus grayish brown
0.1
Basidiospores
Pileus colour
A. pallidorosea HKAS75786
A. pallidorosea HKAS75483
A. pallidorosea HKAS71023
A. pallidorosea HKAS75783
A. pallidorosea HKAS75784
A. pallidorosea HKAS77349
A. pallidorosea HKAS77348
A. pallidorosea HKAS77327
A. pallidorosea HKAS77329
A. pallidorosea HKAS61937
A. bisporigera RET377-9
A. rimosa HKAS77335
A. rimosa HKAS75778
A. rimosa HKAS75777
A. rimosa HKAS77279
A. rimosa HKAS77336
A. rimosa HKAS77105
A. rimosa HKAS77120
A. rimosa HKAS75779
A. virosa HKAS56694
A. virosa HMJAU23304
A. virosa HKAS71040
A. virosa HMJAU23303
A. virosa HMJAU20396
A. sp. 1 RET397-8
A. sp. 1 RET327-10
A. sp. 1 RET368-8
A. sp. 1 RET480-1
A. sp. 2 HKAS77350
A. ocreata HKAS79686
A. subjunquillea HKAS77325
A. subjunquillea HKAS75772
A. subjunquillea HKAS54509
A. subjunquillea HKAS77345
A. subjunquillea HKAS75771
A. subjunquillea HKAS74993
A. subjunquillea HMJAU20412
A. subjunquillea HMJAU23276
A. subjunquillea HKAS63418
A. subjunquillea HKAS75770
A. phalloides HKAS75773
A. fuliginea HKAS75782
A. fuliginea HKAS75780
A. fuliginea HKAS75781
A. fuliginea HKAS77132
A. fuliginea HKAS79685
A. sp. 3 HKAS77344
A. sp. 3 HKAS77351
A. sp. 3 HKAS77342
A. sp. 3 HKAS77343
A. sp. 4 HKAS77326
A. sp. 4 HKAS77347
A. subalbiacea RET491-7
A. subalbiacea RET478-6
A. subalbiacea RET490-1
A. sp. 5 RET493-6
A. sp. 5 RET422-8
A. exitialis HKAS75775
A. exitialis HKAS75774
A. exitialis HKAS75776
A. exitialis HKAS74673
A. sp. 6 HKAS77324
A. sp. 6 HKAS75555
A. sp. 6 HMJAU20469
A. sp. 7 HKAS77334
A. sp. 7 HKAS77333
A. sp. 7 HKAS77332
A. fuligineoides HKAS52727
A. sp. 8 HKAS75150
A. sp. 9 HKAS77323
A. sp. 10 HKAS777322
A. zangii GDGM29241
A. zangii HKAS77331
A. sp. HKAS77321
A. aff. fritillaria HKAS56832
A. aff. fritillaria HKAS57649
A. sp. HKAS77339
A. sp. HKAS77340
A. pseudoporphyria HKAS56984 *
A. pseudoporphyria HKAS57356 *
A. manginiana HKAS56933
A. oberwinklerana HKAS77330 *
A. modesta HKAS75405 *
A. modesta HKAS79688 *
A. virgineoides HKAS79691
A. vestita HKAS79687
A. aff. parvipantherina HKAS56822
A. rubrovolvata HKAS56744
A. subglobosa HKAS58837
A. subfrostiana HKAS57042
90/84/1.0
88/81/1.0
91/86/1.0
95/75/.99
-/-/.96
92/72/1.0
92/-/1.0
85/83/1.0
100/84/1.0
98/88/1.0
98/83/1.0
90/86/1.0
100/83/1.0
99/75/1.0
83/-/-
-/-/.98
-/70/.98
78/-/-
98/82/1.0
Lethal amanitas
A. subgen. Lepidella
A. subgen. Amanita
Clade I
Clade II
Clade III
Clade IV
Clade V
Clade VI
Clade VII
Clade VIII
Clade IX


Cellulose
E
C
Cellodextrins
ß
Glucose
Extracellular
Intracellular
Ectomycorrhizal (symbiotic)
Saprotrophic (free-living)
ECß
Ectomycorrhizal Amanita (Subgenus Lepidella)
Ectomycorrhizal Amanita (Subgenus Amanita)
Free-living Amanita
Limacella
Pluteus and Volvariella
Amanita affin. flavorubens
A. flavorubens
A. novinupta
A. brunneolocularis
A. rubescens
A. affin. flavoconia
A. flavoconia
A. affin. excelsa
A. affin. spissa
A. affin. luteofusca
A. affin. luteolovolvata
A. affin. citrina
A. citrina sensu auct. amer.
A. brunnescens
A. affin. brunnescens
A. rubescens var. congolensis
A. silvicola
A. westii
A. cinereoconia
A. cinereopannosa
A. strobiliformis
A. subalbida
A. mutabilis
A. hesleri
A. marmorata
A. crassiconus
A. affin. virosa
A. phalloides
A. verna
A. costaricensis
A. atkinsoniana
A. smithiana
A. abrupta
A. onusta
A. gracilior
A. solitaria
A. afrospinosa
A. pelioma
A. ochrophylla
A. daucipes
A. pyramidifera
A. clelandii
A. conicobulbosa
A. effusa
A. sublutea
A. farinacea
A. polypyramis
A. chlorinosma
A. proxima
A. praelongispora
A. subsolitaria
A. rhopalopus
A. cokeri
A. subcokeri
A. longipes
A. tephrea
A. eriophora
A. amanitoides
A. affin. volvata
A. sp-Arora-01-560
A. peckiana
A. multisquamosa
A. magnivelata
A. subglobosa
A. parvipantherina
A. praecox
A. xylinivolva
A. atlipes
A. crenulata
A. pulverulenta
A. pudica
A. frostiana
A. muscaria subsp. flavivolvata
A. muscaria var. guessowii
A. weirii
A. murinoflammeum
A. umbrinella
A. constricta
A. sinicoflava
A. cecilieae sensu auct. amer.
A. fulva sensu auct. amer.
A. affin. vaginata
A. populiphila
A. friabilis
A. egregia
A. zambiana
A. jacksonii
A. ristichii
A. yuaniana
A. banningiana
A. subcaligata
A. armillariiformis
A. gracilipes
A. manicata
A. nauseosa
A. prairiicola
A. codinae
A. singeri
A. pruittii
A. inopinata
A. miersii
A. sp-Ridley-2
A. vittadinii
Limacella affin. illinita
L. glischra
Pluteus petasatus
Pluteus cervinus
Volvariella volvacea
0.03
EU346871 Amanita muscaria
AF345820 Coprinopsis cothurnata
EU168109 Coprinopsis cinerea
AF345817 Coprinopsis stercorea
AY461833 Coprinopsis cothurnata
FJ386439 Coprinopsis stercorea
AY461839 Coprinopsis stercorea
AY461828 Coprinopsis stercorea
AM712280 Psathyrella multipedata
AM712279 Psathyrella multipedata
DQ389684 Psathyrella microrrhiza
AM712276 Psathyrella spadiceogrisea
DQ389682 Psathyrella spadiceogrisea
DQ389683 Psathyrella clivensis
AF345818 Coprinellus flocculosus
AY521250 Coprinellus verrucispermus
AY461824 Coprinellus curtus
AY461834 Coprinellus curtus
AY461815 Coprinellus radians
AY461818 Coprinellus radians
EU168103 Coprinellus radians
EU168106 Coprinellus xanthothrix
FJ755223 Coprinellus xanthothrix
AF361228 Coprinellus xanthothrix
AF345822 Coprinellus radians
AB470820 Coprinellus radians
FJ462761 Coprinellus radians
FJ582637 Coprinellus radians
AY461838 Coprinellus disseminatus
AF345809 Coprinellus disseminatus
FN386275 Coprinellus disseminatus
FJ228213 Coprinellus disseminatus
EU436684 Coprinellus micaceus
AY461832 Coprinellus micaceus
AF345808 Coprinellus micaceus
FN386285 Coprinellus micaceus
BAFCcult 3218
BAFCcult 3311
EU551214 Coprinellus micaceus
BAFCcult 3313
BAFCcult 3312

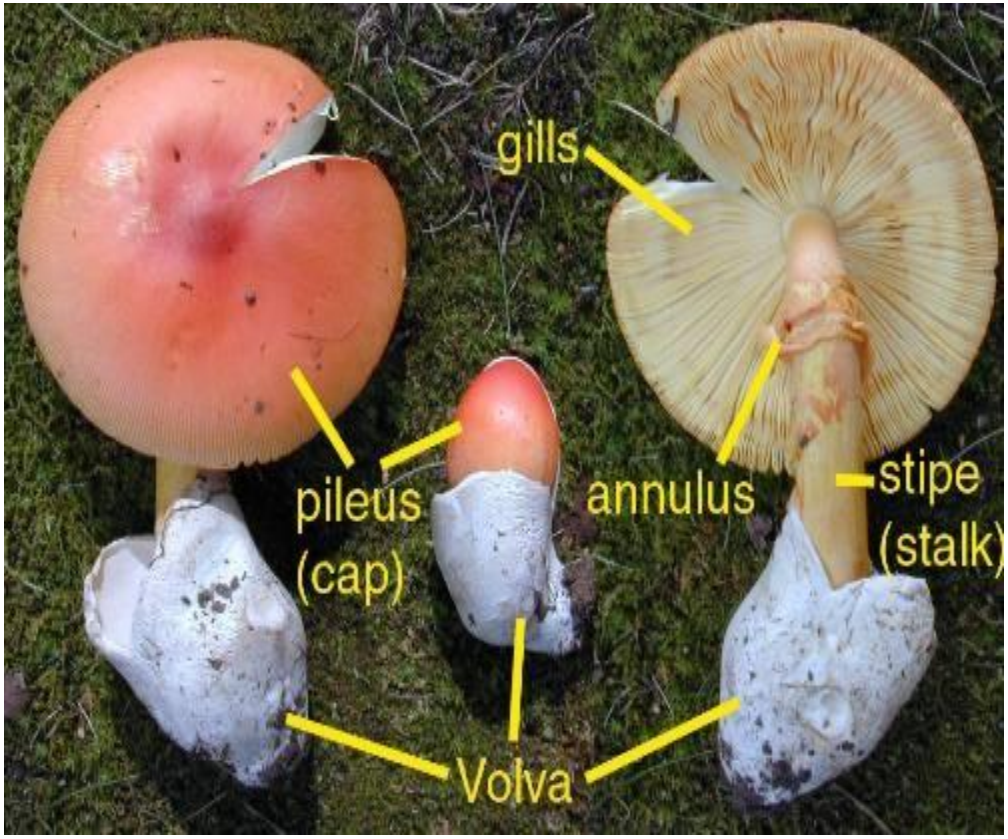
Spore printing wild mushrooms



Spore printing wild mushrooms



Amanita caesarea- edible



Amanita caesarea **and its American relatives** ***Amanita hemibapha*** **and** ***Amanita jacksonii*** **are among the relatively few widely-consumed edible** ***Amanita*** **species.**

Amanita caesarea- edible

Amanita jacksonii- edible

Amanita jacksonii- edible

Amanita jacksonii- edible

Amanita jacksonii- edible

Amanita jacksonii- edible

Amanita hemibapha- edible

Amanita hemibapha- edible

Amanita hemibapha- edible

Amanita hemibapha var. ochracea

Coprinus comatus

Coprinus comatus

Coprinus comatus

Coprinus calyptratus

Coprinellus micaceus

Coprinellus micaceus

Coprinellus micaceus

Tiny toadstools - Coprinus disseminatus

Coprinus hiascens

Coprinus hiascens

Coprinus silvaticus

Coprinus silvaticus

Coprinus atramentarius

Coprinus atramentarius

Coprinellus micaceus

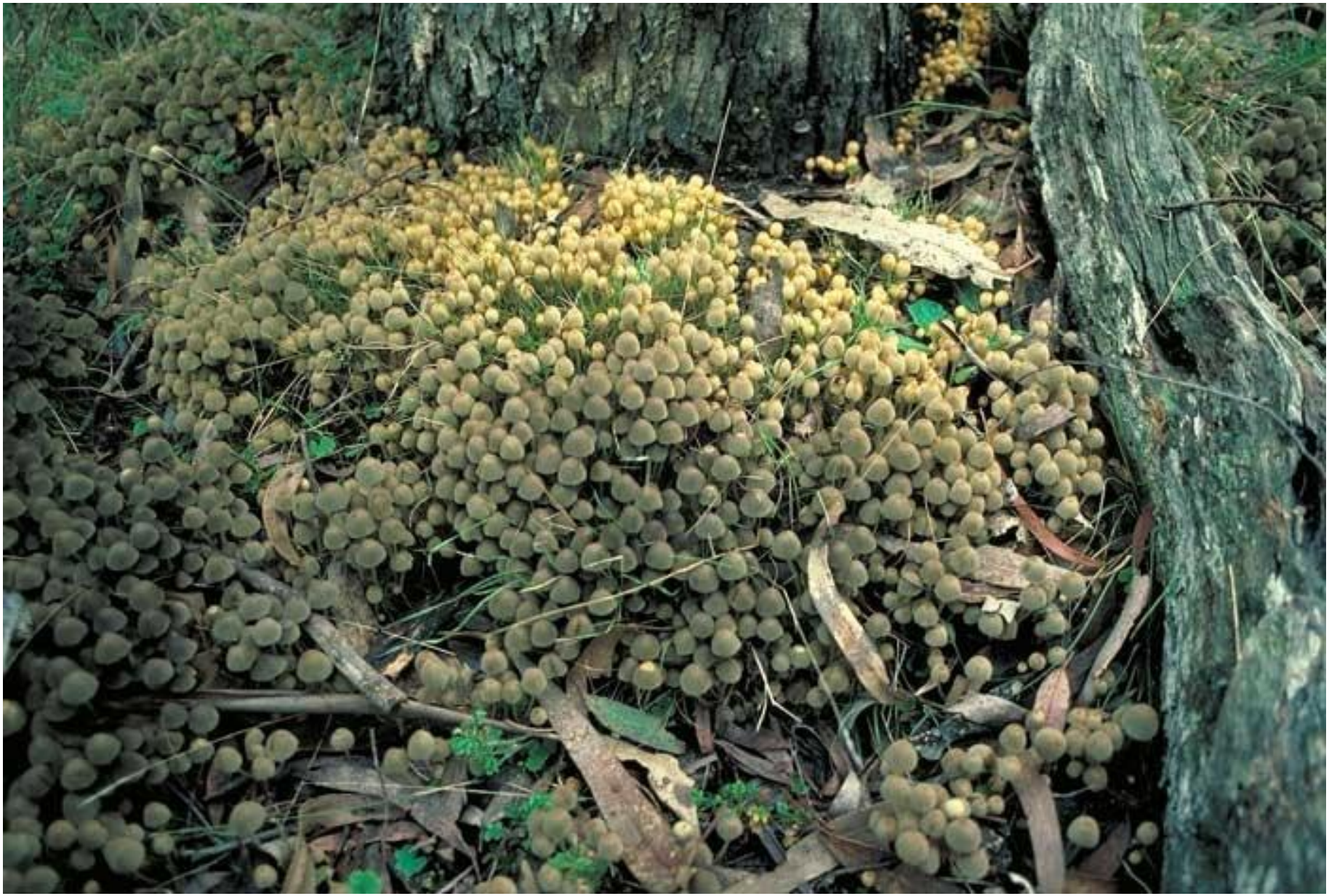
Coprinus Picaceus

Coprinus Picaceus

Coprinus disseminatus

Coprinus disseminatus

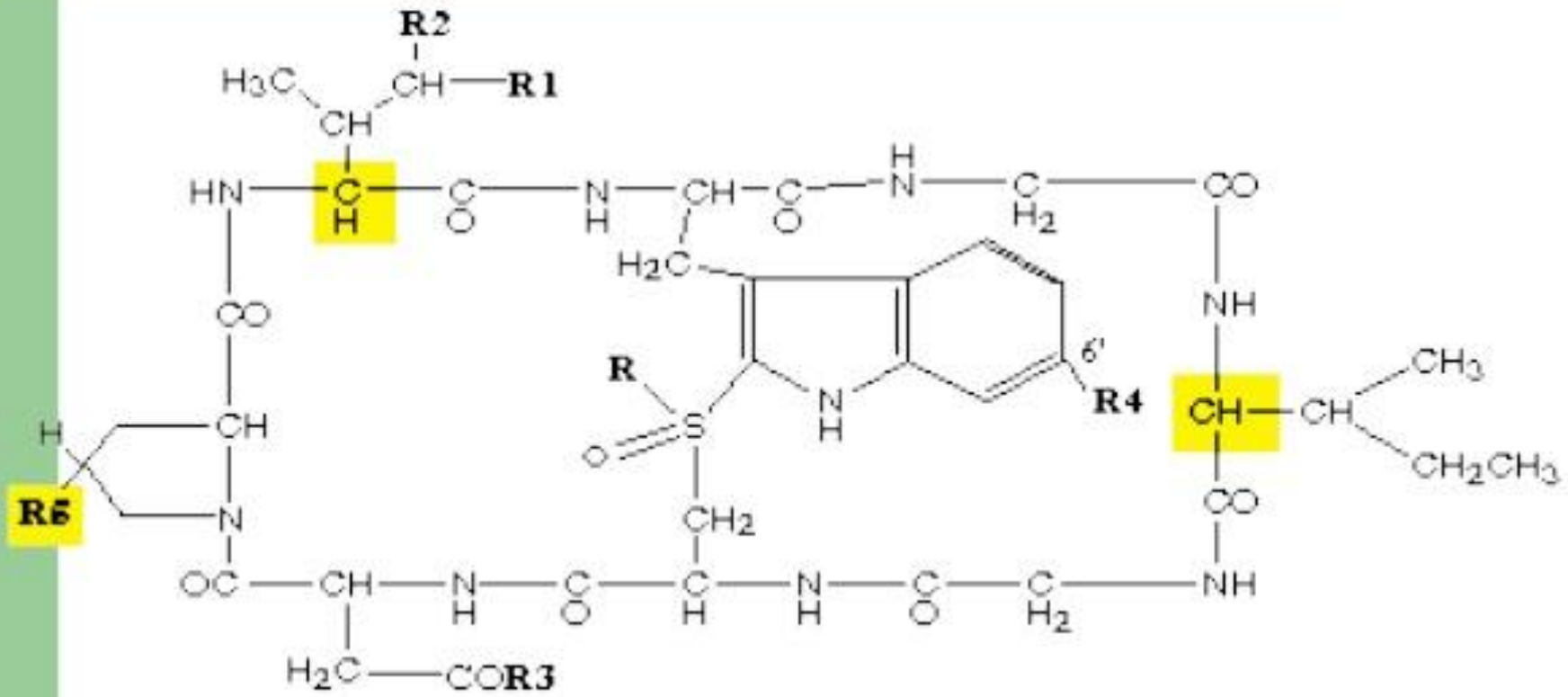
Coprinus disseminatus



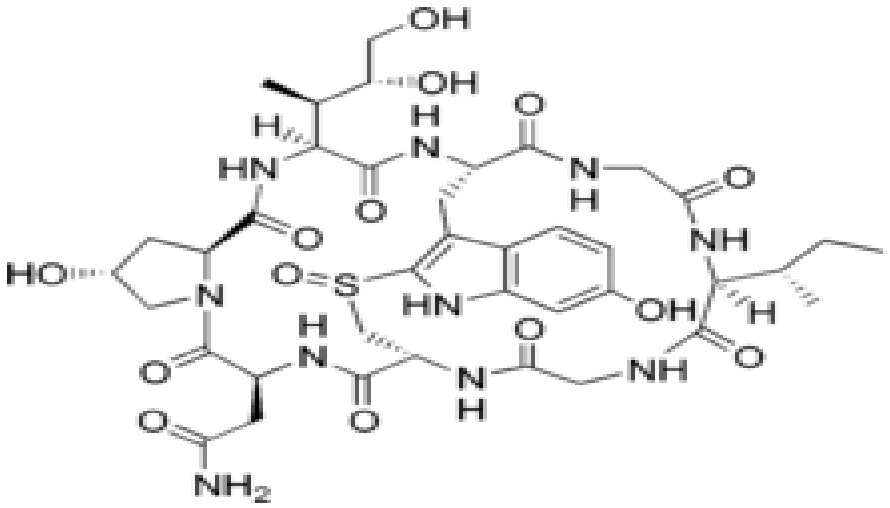
Russula parazurea

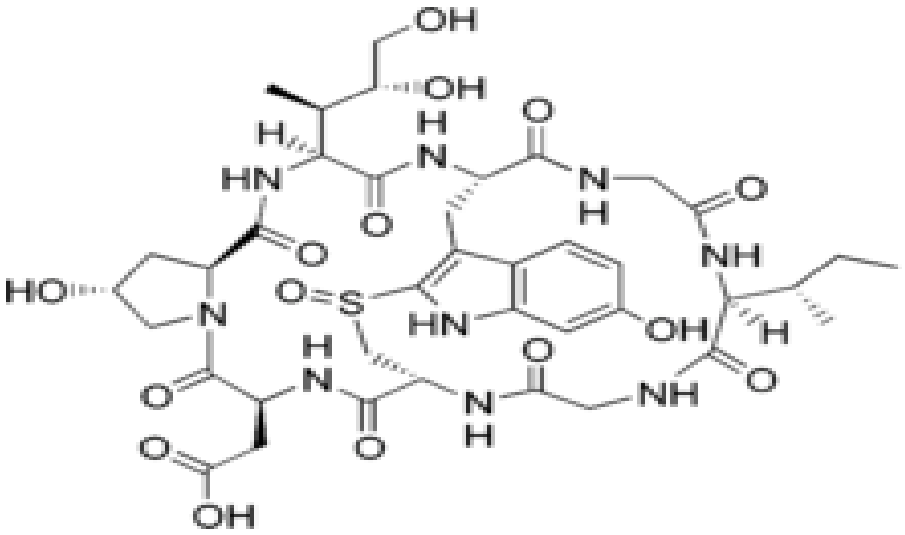
Galeria nagrzyby

General Structure of Amatoxin



A. PHALLOIDES (DEATH *CAP*)
Warning sign in Canberra, Australia



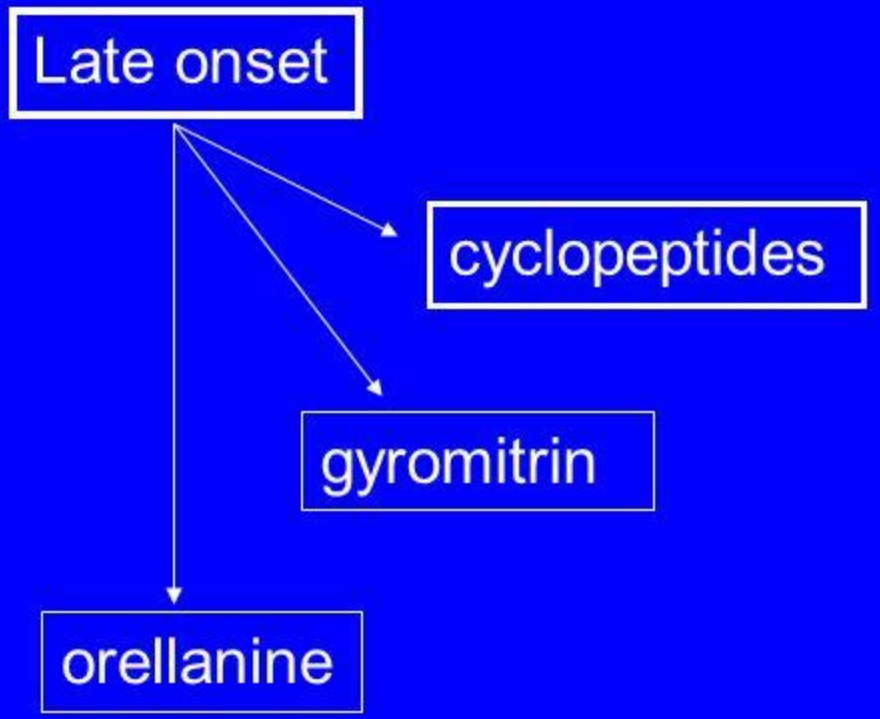


Amanita phalloides (death cap)

- A single *Amanita phalloides* mushroom may be lethal.
- **Amatoxins and phallotoxins** are the mycotoxins of ***Amanita phalloides.***
- They are cyclic olego**peptide toxins** .
- **oligopeptide** (oligo-, "few") consists of between 2 and 20 amino acids.

Mushroom Poisoning

- Late onset symptoms
  - **Cyclopeptide Mushrooms**
    - 3 main types of toxins: amatoxins, virotoxins, phallotoxins
    - *amanita phalloides* ("Death Cap") most well known species
      - contains amatoxins
      - responsible for the vast majority of deaths
      - easily misdiagnosed as gastroenteritis
      - patients may not associate symptoms with mushroom ingestions because of the delayed onset



Amanitins (Cyclopeptides)

- Toxins produced by *Amanita phalloides* (death cap) and *Amanita virosa* (destroying angel) (and others in this group)
- These two species account for 95% of all mushroom fatalities with *A. phalloides* causing the most poisoning
- Two cyclopeptide toxin types are phallotoxins and amatoxins

Phallotoxins

Genernal information: Found in *phalloides* commonly known as "Death Cap". This mushroom was discovered by Lynen and Ulrich Wieland in 1938.

Mechanism of actions: Attack plasma membrane and bind to protein receptors. Cells leak Ca^{++} and then K^{+} . Toxin enters cytoplasm and attacks organelles by rupturing lysosome membrane.

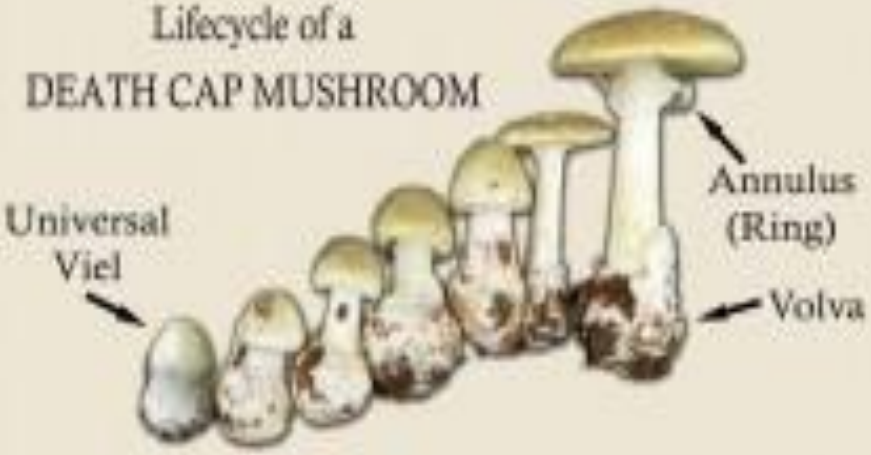
WARNING

Death Cap Mushrooms Grow in Our Area

WORLD'S MOST DANGEROUS MUSHROOM

WARNING

Death Cap Mushrooms Grow in Our Area

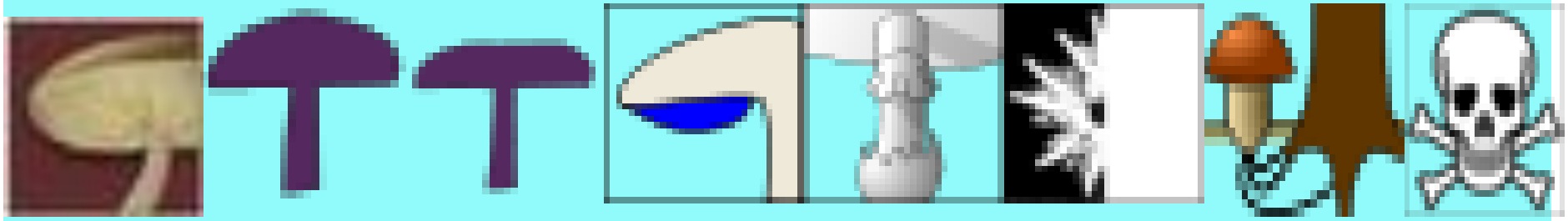


Please keep an eye to the ground in your backyard and when walking your dogs.

If you suspect your dog has eaten a Death Cap Mushroom get to a veterinarian IMMEDIATELY!!!

Description of *Amanita phalloides*

Mycological characteristics



gills	**gills** on hymenium
cap	cap is **convex** or **flat**
hymenium	hymenium is **free**
stipe	stipe has a **ring and volva**
spore print	spore print is **white**
ecology	ecology is **mycorrhizal**
edibility	edibility: **deadly**

THE MOST COMMON POISONOUS MUSHROOMS

Livid entoloma

Fly agaric

Destroying angel

Cortinar

Death cap

Sulfur tuft

Ivory funnel

Deadly fibrecap

Yellow-staining


DEATH CAP MUSHROOM
gills
volva
skirt
universal
veil

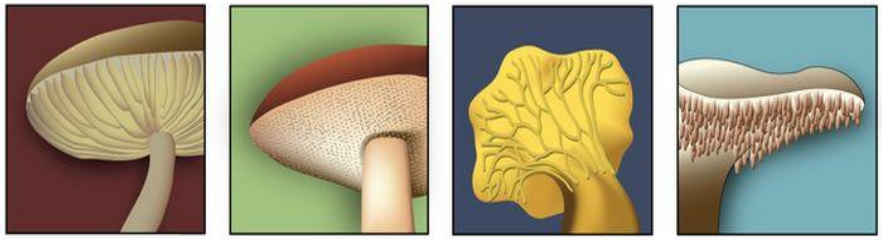
Collins

How to Identify Edible Mushrooms

Patrick Harding • Tony Lyon • Gill Tomblin

'delightful, well-conceived, user-friendly' *The Garden*, RHS Magazine

Spore-bearing surface under cap



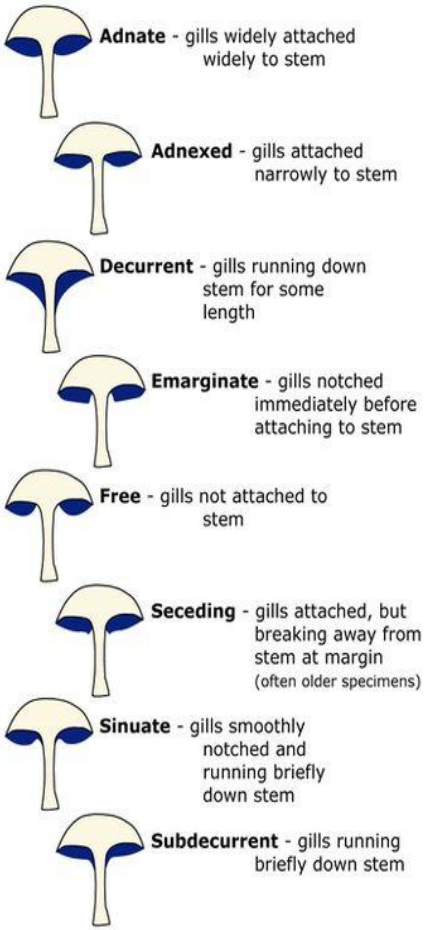
Gills: wide and thin sheet-like plates radiating from stem

Pores: many small tubes ending in a spongy surface

Ridges: short, blunt elevated lines on stem and under cap

Teeth: many small finger-like projections

Gill attachment



Adnate - gills widely attached widely to stem

Adnexed - gills attached narrowly to stem

Decurrent - gills running down stem for some length

Emarginate - gills notched immediately before attaching to stem

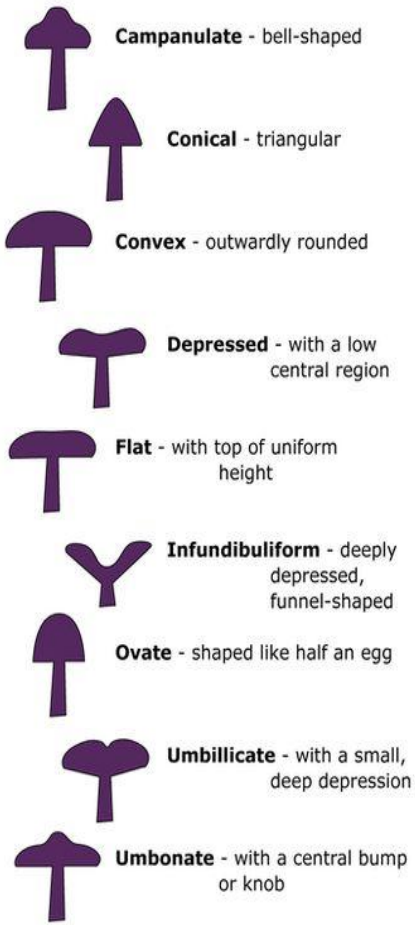
Free - gills not attached to stem

Seceding - gills attached, but breaking away from stem at margin (often older specimens)

Sinuate - gills smoothly notched and running briefly down stem

Subdecurrent - gills running briefly down stem

Cap morphology



Campanulate - bell-shaped

Conical - triangular

Convex - outwardly rounded

Depressed - with a low central region

Flat - with top of uniform height

Infundibuliform - deeply depressed, funnel-shaped

Ovate - shaped like half an egg

Umbillicate - with a small, deep depression

Umbonate - with a central bump or knob

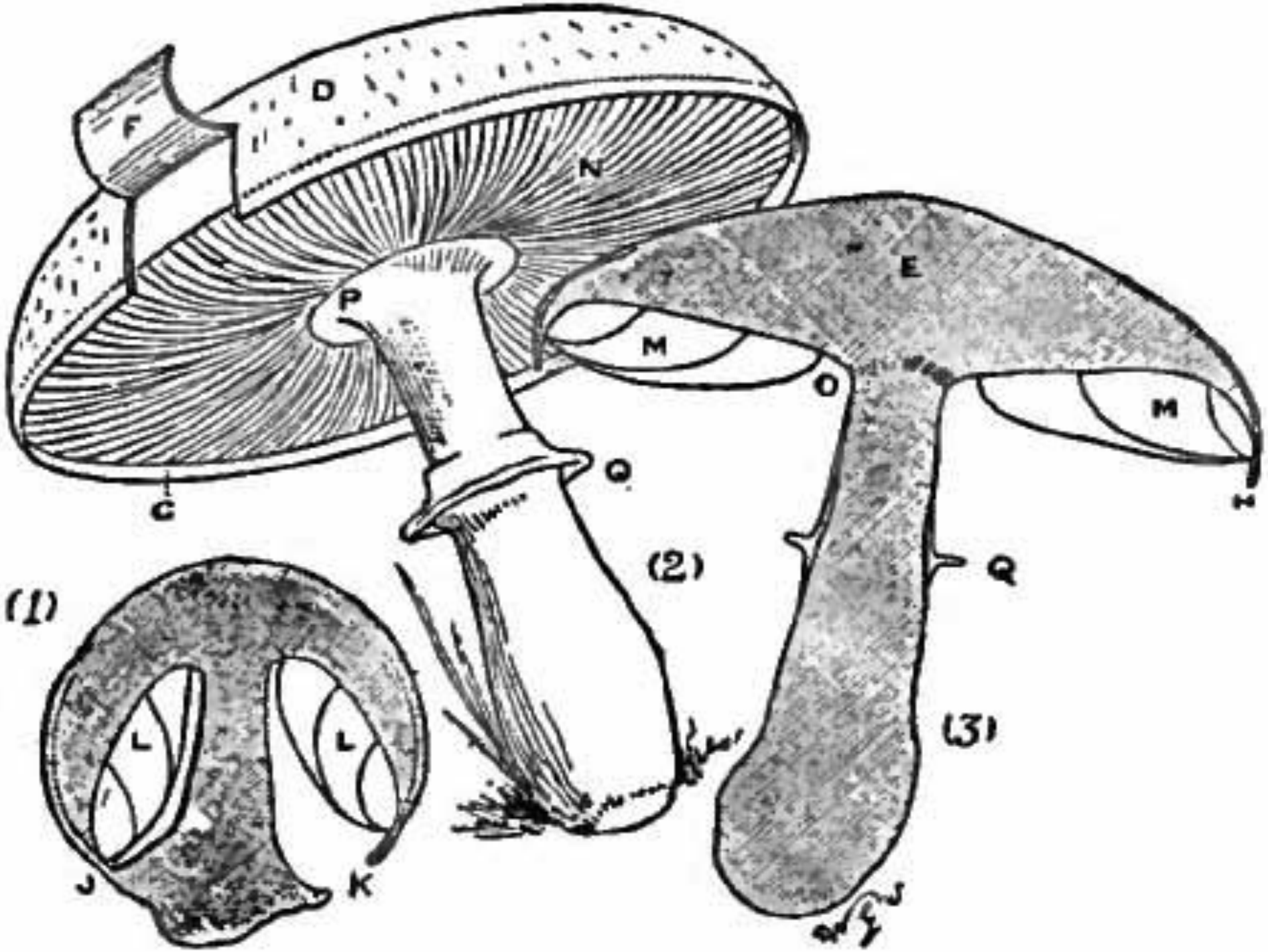
Table 2: Toxicity Classes: Gosselin, Smith and Hodge		
Probable Oral Lethal Dose (Human)		
Toxicity Rating or Class	**Dose**	**For 70-kg Person (150 lbs)**
6 Super Toxic	Less than 5 mg/kg	1 grain (a taste - less than 7 drops)
5 Extremely Toxic	5-50 mg/kg	4 ml (between 7 drops and 1 tsp)
4 Very Toxic	50-500 mg/kg	30 ml (between 1 tsp and 1 fl ounce)
3 Moderately Toxic	0.5-5 g/kg	30-600 ml (between 1 fl oz and 1 pint)
2 Slightly Toxic	5-15 g/kg	600-1200 ml (between 1 pint to 1 quart)
1 Practically Non-Toxic	Above 15 g/kg	More than 1200 ml (more than 1 quart)

Mushrooming without Fear

The Beginner's Guide to Collecting Safe and Delicious Mushrooms

Alexander Schwab

Defying Death Caps


D
F
N
E
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M
O
M
Q
C
(2)
Q
(1)
L
L
J
K
(3)

"What's this? I ordered a 'Death cap mushroom' topping! "

Death Cap Mushrooms

They are growing *NOW*!
These were photographed in a lawn in Woodside, CA on 10/4/2010.

Dogs and children can eat these mushrooms and die from their toxicity. Keep your children and pets safe.

Pick Death Caps, bag them and throw them away. If ingested take mushroom remains and get medical help ***immediately!***

For more info go to www.tinyurl.com/MushroomPoisoning

If your dog has eaten a Death Cap Mushroom

"Donato"
Died at 6 Months of Mushroom Toxicity

- Remove any pieces from your dog's mouth.
- Go *IMMEDIATELY* to an Emergency Veterinary Hospital!!!
- If far from help, induce vomiting with Hydrogen Peroxide and call 911 to find nearest Vet!

- Save mushrooms in paper or waxed paper rather than plastic bags and refrigerate until it can be examined for identification.
- Report incident to North American Mycological Association www.namyco.org
- For more information go to www.Mushrooms911.blogspot.com

Nickname	Poisonous/ Edible	Season Start	Season End
Agaricus macrosporus	Edible	July	October
Amethyst Deciever	Edible	June	December
Bay Boletus	Edible	September	November
Beefsteak Fungus	Edible	August	November
Birch Polypore	Edible	All year	All year
Cauliflower Fungus	Edible	September	November
Cep	Edible	August	November
Chanterelle	Edible	June	November
Chicken Of The Woods	Edible	May	August
Common Puffball	Edible	July	November
Common Yellow Russula	Edible	August	November
Dryads Saddle	Edible	February	August
Fairy Ring Champignons	Edible	April	August
Field Blewit	Edible	N/A	N/A
Field Mushroom	Edible	August	November
Giant Funnel Mushroom	Edible	September	December
Giant Puff Ball	Edible	July	November
Glistening Ink Cap	Edible	May	October
Green Cracking Russula	Edible	August	November
Hedgehog Fungus	Edible	August	November
Honey Fungus	Edible	June	December
Horn Of Plenty	Edible	September	November
Horse Mushroom	Edible	September	November
Meadow Wax Cap	Edible	August	November
Morels	Edible	April	May
Orange Birch Bolete	Edible	July	November
Oyster Mushroom	Edible	All year	All year
Parasol	Edible	May	November
Porcelain Fungus	Edible	August	November
Powdery Brittlegill	Edible	July	October
Red Cracked Bolete	Edible	July	October
Saffron Milk Cap	Edible	July	November
Scarlet Hood	Edible	August	November
Shaggy Ink Caps	Edible	August	November
Shaggy Parasol	Edible	July	December
Slippery Jack	Edible	September	November
St Georges Mushroom	Edible	April	May
Stump Puffball	Edible	July	November
Tawyny Grisette	Edible	September	November
The Blusher	Edible	June	November
The Blushing Wood Mushroo	Edible	September	November
The Charcoal Burner	Edible	July	December
The Deceiver	Edible	June	November
The Prince	Edible	August	November
Truffles	Edible	August	November
Velvet Shank	Edible	October	March
Winter Chanterelle	Edible	August	December
Wood Blewit	Edible	September	December
Wood Ears	Edible	All year	All year
Wood mushroom	Edible	September	November
Yellow Swamp Russula	Edible	September	November

Classes of Mushroom Toxins

- PROTOPLASMIC POISONS - CAUSES CELL DAMAGE
- NEUROTOXINS – POISONS PRINCIPALLY AFFECTING THE AUTONOMIC NERVOUS SYSTEM
- NEUROTOXINS - POISONS PRINCIPALLY AFFECTING THE CENTRAL NERVOUS SYSTEM
- GASTROINTESTINAL IRRITANTS
- OTHER CAUSES OF ILLNESS

***Amanita phalloides*, the death cap**

Protoplasmic Poisons

a. Amatoxin (amanitin)

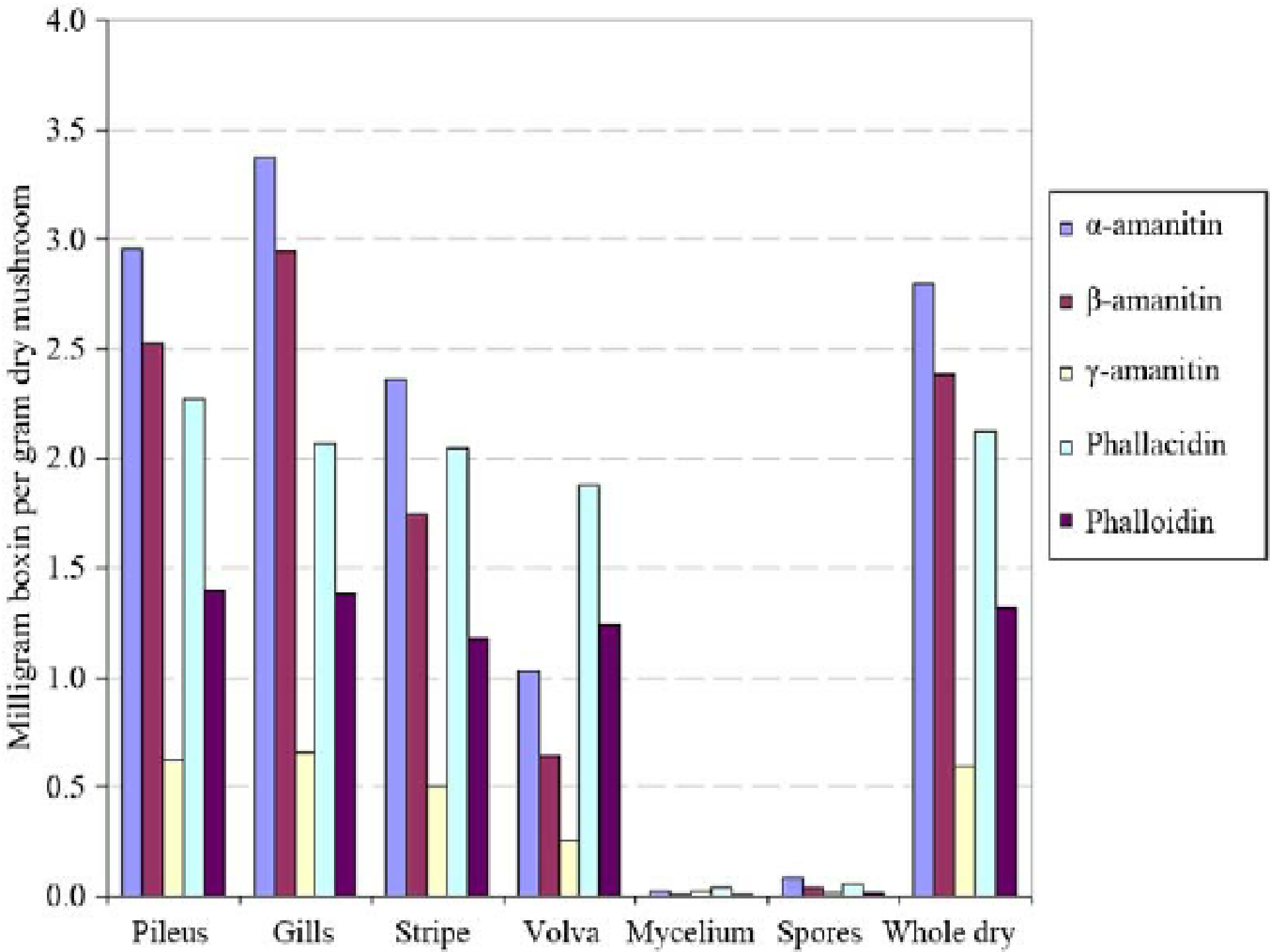
- Death Cap or Destroying Angel (*Amanita phalloides, A. virosa)* and several relatives
- Fool's Mushroom (*A. verna*) and some of its relatives
- Autumn Skullcap (*Galerina autumnalis*)

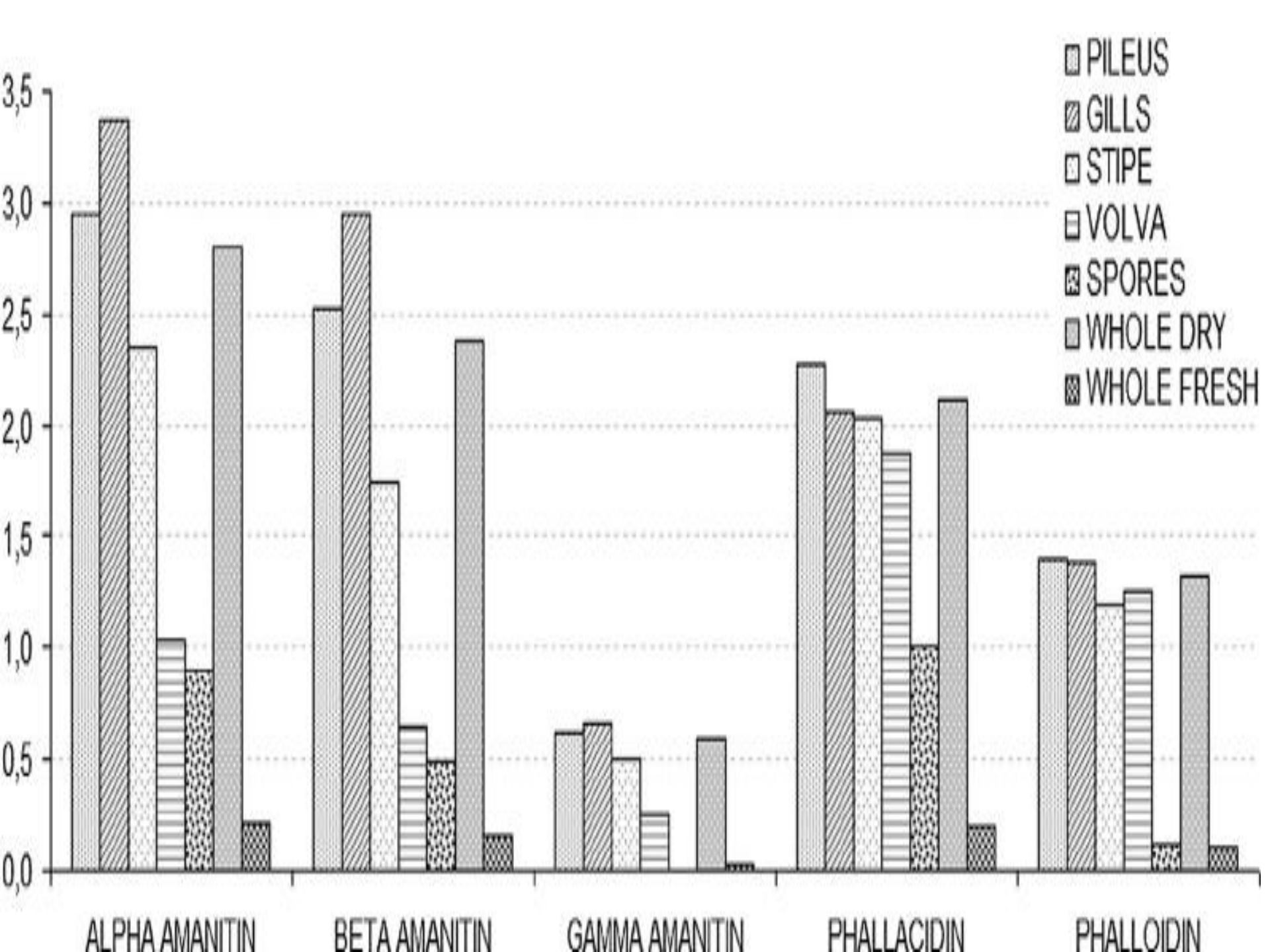
PROTOPLASMIC POISONS - CAUSES CELL DAMAGE

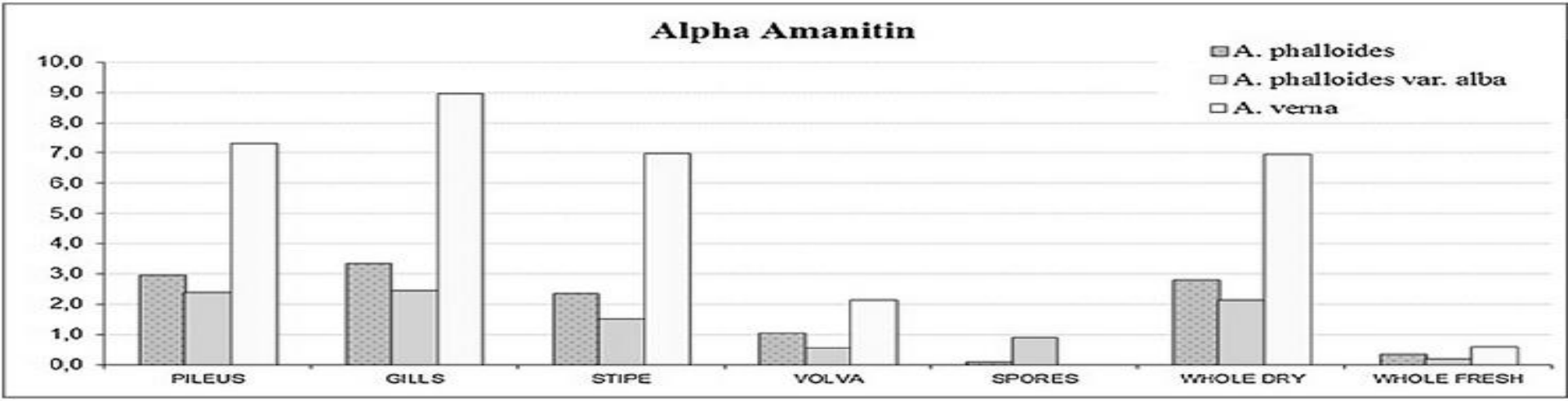
- AMATOXINS: (cyclic octapeptides)
  - **phallotoxins –**
  - if injected into mice, death at high doses occurs in 1 hour. Ten times more lethal than cyanide! However, it is not easily absorbed by digestive system if ingested.
  - **amatoxins -**
  - if injected into a mouse, lethal effects are not exerted for 15 hours. Lethal dose for an adult human is 5-10 mg.
    - Inhibits RNA polymerase, so it interferes with RNA transcription, which results in a slow lingering death.

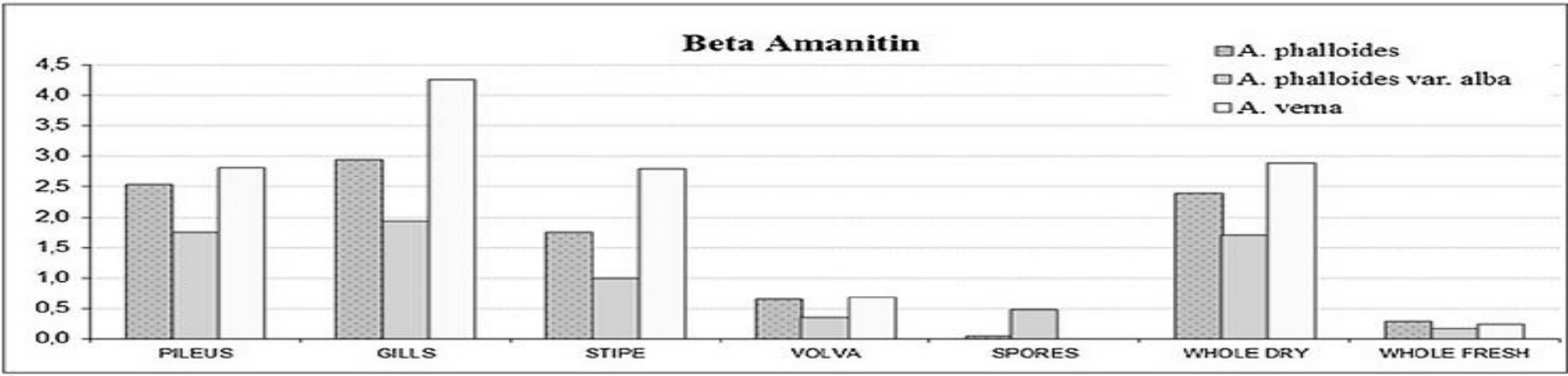
Amanita virosa - the destroying angel

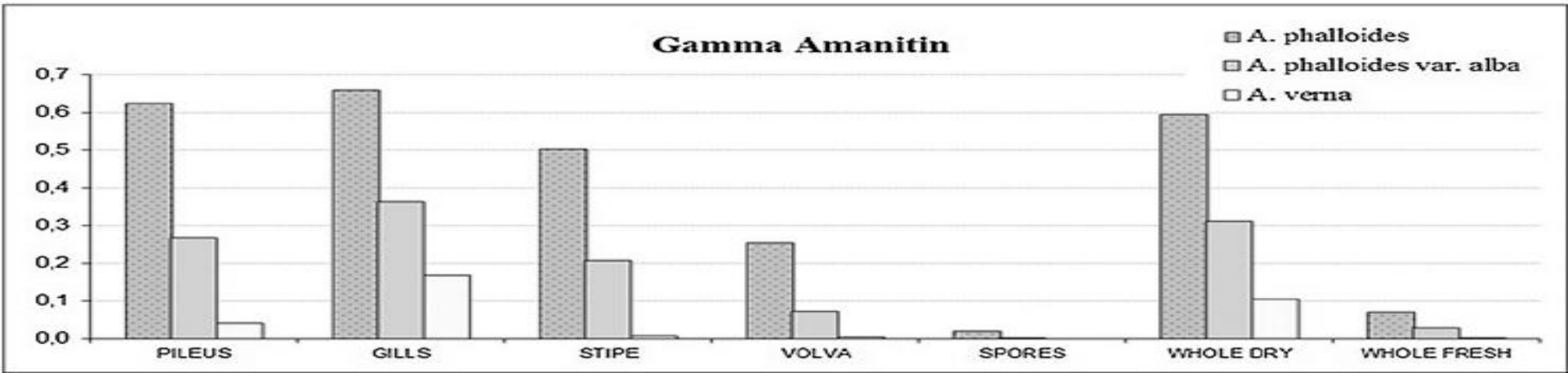
Galerina autumnalis


Milligram boxin per gram dry mushroom
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Pileus
Gills
Stripe
Volva
Mycelium
Spores
Whole dry
α-amanitin
β-amanitin
γ-amanitin
Phallacidin
Phalloidin


PILEUS
GILLS
STIPE
VOLVA
SPORES
WHOLE DRY
WHOLE FRESH
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
ALPHA AMANITIN
BETA AMANITIN
GAMMA AMANITIN
PHALLACIDIN
PHALLOIDIN


Alpha Amanitin
A. phalloides
A. phalloides var. alba
A. verna
10,0
9,0
8,0
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
PILEUS
GILLS
STIPE
VOLVA
SPORES
WHOLE DRY
WHOLE FRESH


Beta Amanitin
A. phalloides
A. phalloides var. alba
A. verna
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
PILEUS
GILLS
STIPE
VOLVA
SPORES
WHOLE DRY
WHOLE FRESH


Gamma Amanitin
A. phalloides
A. phalloides var. alba
A. verna
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0,0
PILEUS
GILLS
STIPE
VOLVA
SPORES
WHOLE DRY
WHOLE FRESH

Example – Mushroom Poisoning

- Most dangerous mushrooms are the "death cap" (Amanita phalloides) or the "death angel" (Amanita ocreata).
- Most susceptible are children less than 10 years of age
- Initial symptoms are nausea, vomiting, diarrhea and irregular heart rate
- Amatoxin, damages the liver cells causing liver and kidney failure and possibly death
- Amatoxin is very potent: only 0.1 to 0.3 mg/kg of body weight results in death

Locoweeds

Astragalus spp and Oxytropis spp. (existing throughout the world)

Principal Toxin:
Swainsonine (first isolate from *Swainsona canescens)* – previously called locoine
Average concentration of swainsonine in locoweed is 0.09 - 0.23% (dry weight)

MoA:
- ✓ Inhibit the action of two lysosomal enzymes (α-D-mannosidase and Golgi mannosidase II) that aid in the metabolism of saccharides.
- ✓ Inhibition of α-mannosidase caused accumulation of complex sugars or oligosaccharides.
- ✓ Golgi mannosidase II caused accumulation of normal structure of oligosaccharide components of glycoproteins.
- ✓ As a result, oligosaccharides accumulate in the cells of the brain and many other organs and interfere with normal cellular function.

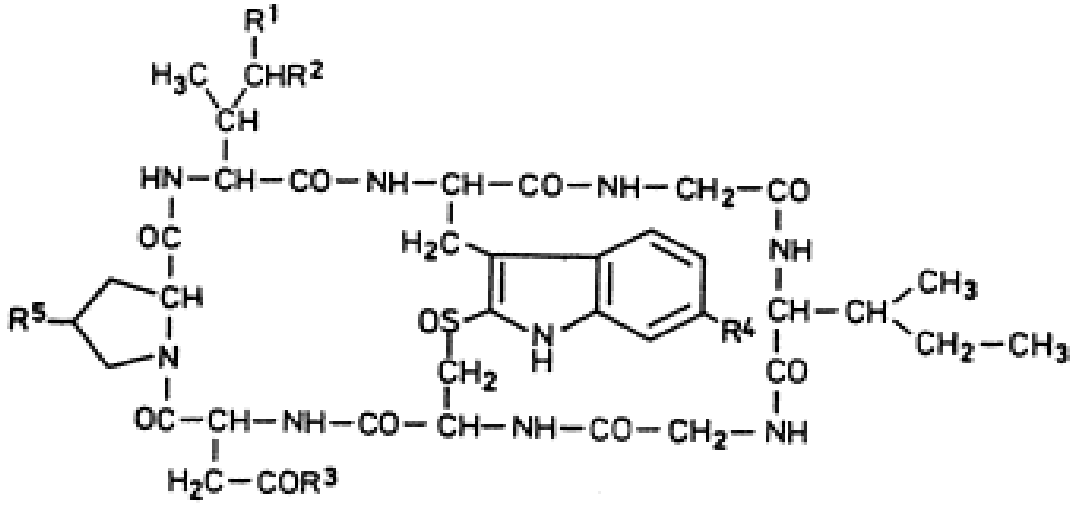
Signs: Horses show the nervous signs of locoweed poisoning more commonly than do cattle or sheep. circling, incoordination, staggering gait, and unpredictable behavior

✓ The prognosis for locoed horses should therefore always be guarded.

It causes a generalized lysosomal storage disease similar to the genetically transmitted disease mannosidosis.

Group 1 - Amatoxins

- Most difficult to treat. 90% of all deaths due to mushroom poisoning
- Species include *Amanita Phalloides, Amanita Ocreata, Gallerina Autumnalis*
- Toxin is stable to cooking, pickling, salting and is not hydrolyzed by digestion
- Toxins include amanitins and phallotoxin which inhibit RNA polymerase II



Compounds	Substituents					LD_{50} (mg/kg)
	R^1	R^2	R^3	R^4	R^5	
α -Amanitin	CH_2OH	OH	NH_2	OH	OH	0,3
β -Amanitin	CH_2OH	OH	OH	OH	OH	0,5
γ -Amanitin	CH_3	OH	NH_2	OH	OH	0,2
ε -Amanitin	CH_3	OH	OH	OH	OH	0,3
Amanin	CH_2OH	OH	OH	H	OH	0,5
Amanin amide	CH_2OH	OH	NH_2	H	OH	0,3
Amanullin	CH_3	H	NH_2	OH	OH	20
Amanullinic acid	CH_3	H	OH	OH	OH	20
Proamanullin	CH_3	H	NH_2	OH	H	20

Amanita muscaria

- Long history of use as an intoxicant
- Used by native peoples in many parts of the world
- Possibly used in India for 4000 years - Soma hymns of Rig Veda have been interpreted as description of *A. muscaria*
- Used for centuries by tribes in Siberia
  - Excreted unaltered - so urine collected and drunk for a second dose among the poor

NOT ALL SPECIES OF *AMANITA* ARE POSIONOU

- Caesar's amanita or *Amanita caesarea* is considered to be a choice edible in Europe
- *Amanita caesarea* is not found in North America; similar but different biological species in U.S.; still safe eat?
  - *Amanita hemibapha* and *Amani jacksonii* are sometimes called the American Caesar's Amanita
- If scales of universal veil wash off o cap, it may be *Amanita muscaria* (toxic) and not *Amanita caesarea*
- USE CAUTION! DO NOT EAT!

Mushroom species belonging to Amanita genus

- *A. virosa (amatoxin)*
- *A. phalloides (phallotoxin)*
- *A. pantheria (Ibotenic acid)*
- *Morchella (edible)*

Amatoxin

Genernal information: Found in *virosa* and commonly known as "Destroying Angels".

Mechanism of actions: This mushroom can cause liver and kidney damage. Toxin invades nucleus of liver cells. Then it destroys nucleolus and inhibits mRNA Polymerase. The toxin circulates to kidneys and attack kidney cells then re-enter blood stream and back to liver. Amatoxins are LETHAL.


Amanita phalloides TGATATTGCTCCTGGCATTGATAGGTTTTATCACACCAATGGAGTTCAATGGCTTTTCTCCACTAAT 67
Amanita phalloides var. alba TGATATTGCTCCTGGCATTGATAGGTTTTATCACACCAATGGAGTTCAATGGCTTTTCTCCACTAAT 67
Amanita phalloides ACATTCAAAGAGAGCAAGGCTATTTTTATTTGAAACAGCCTGCAACCCCCAAAAATCCAATACCTAT 134
Amanita phalloides var. alba ACATTCAAAGAGAGCAAGGCTATTTTTATTTGAAACAGCCTGCAACCCCCAAAAATCCAATACCTAT 134
Amanita phalloides CAAAAAAGCAGACAGGTCTTGAGAATTTAATGACACTCAAACAGGCATGCTCCTCGGAATGCCAAGG 201
Amanita phalloides var. alba CAAAAAAGCAGACAGGTCTTGAGAATTTAATGACACTCAAACAGGCATGCTCCTCGGAATGCCAAGG 201
Amanita phalloides AGCGCAAGGTGCGTTCAAAGATTCGATGATTCACTGAATTCTGCAATTCACATTACTTATCGCATTT 268
Amanita phalloides var. alba AGCGCAAGGTGCGTTCAAAGATTCGATGATTCACTGAATTCTGCAATTCACATTACTTATCGCATTT 268
Amanita phalloides CGCTGCGTTCTTCATCGATGCGAGAGCCAAGAGATCCGTTGTTGAAAGTTGTACTTTATATTTAATC 335
Amanita phalloides var. alba CGCTGCGTTCTTCATCGATGCGAGAGCCAAGAGATCCGTTGTTGAAAGTTGTACTTTATATTTAATC 335
Amanita phalloides AAATCATCATTCTATAAACATGCAACTAGTGTTTAATAAAATGGCATAGACACCCAGATTTTCAACT 402
Amanita phalloides var. alba AAATCATCATTCTATAAACATGCAACTAGTGTTTAATAAAATGGCATAGACACCCAGATTTTCAACT 402
Amanita phalloides TCTCAAGAGACTGGTCAAGGTCTCTCATTCCCAAGTGTCTACAAGTGTGCACAGGTGGAATTGGTAA 469
Amanita phalloides var. alba TCTCAAGAGACTGGTCAAGGTCTCTCATTCCCAAGTGTCTACAAGTGTGCACAGGTGGAATTGGTAA 469
Amanita phalloides TGACCAGAGACGTGCACATGCCCCAGAGGGGCCAGCGACAGCCTCAAGGTTCATTTCATTAATGATC 536
Amanita phalloides var. alba TGACCAGAGACGTGCACATGCCCCAGAGGGGCCAGCGACAGCCTCAAGGTTCATTTCATTAATGATC 536
Amanita phalloides CTTCCGCAGGTCCACCTACGGAAGGATCATTAATGAAATGAACCTTGAGGCTGTCGCTGGCCCCTCT 603
Amanita phalloides var. alba CTTCCGCAGGTCCACCTACGGAAGGATCATTAATGAAATGAACCTTGAGGCTGTCGCTGGCCCCTCT 603
Amanita phalloides GGGGCATGTGCACGTCTCTGGTCATTACCAATTCCACCTGTGCACACTTGTAGACACTTGTTTACTG 670
Amanita phalloides var. alba GGGGCATGTGCACGTCTCTGGTCATTACCAATTCCACCTGTGCACACTTGTAGACACTTGTTTACTG 670
Amanita phalloides AGAGACCTTGACCAGTCTCTTGAGAAGTTGAAAATCTGGGTGTCTATGCCATTTTATTAAACACTAG 737
Amanita phalloides var. alba AGAGACCTTGACCAGTCTCTTGAGAAGTTGAAAATCTGGGTGTCTATGCCATTTTATTAAACACTAG 737
Amanita phalloides TTGCATGTTTAAAGAATGATGATTTGAT 765
Amanita phalloides var. alba TTGCATGTTTAAAGAATGATGATTTGAT 765

False death cap mushrooms (Amanita citrina) near Dibuny, west from Saint Petersburg (Russia)

False death cap mushrooms (Amanita citrina) near Dibuny, west from Saint Petersburg. Russia

Synonyms: Agaricus bulbosus, Agaricus citrinus, Agaricus mappa, Agaricus olivaceus, Amanita bulbosa, Amanita mappa, Amanita porphyria, Amanita venenosa, Amanita virosa, Amanitina citrina, Venenarius mappa.

Amanita virosa

Mycological characteristics

Gills on: hymenium

Cap is: convex or flat

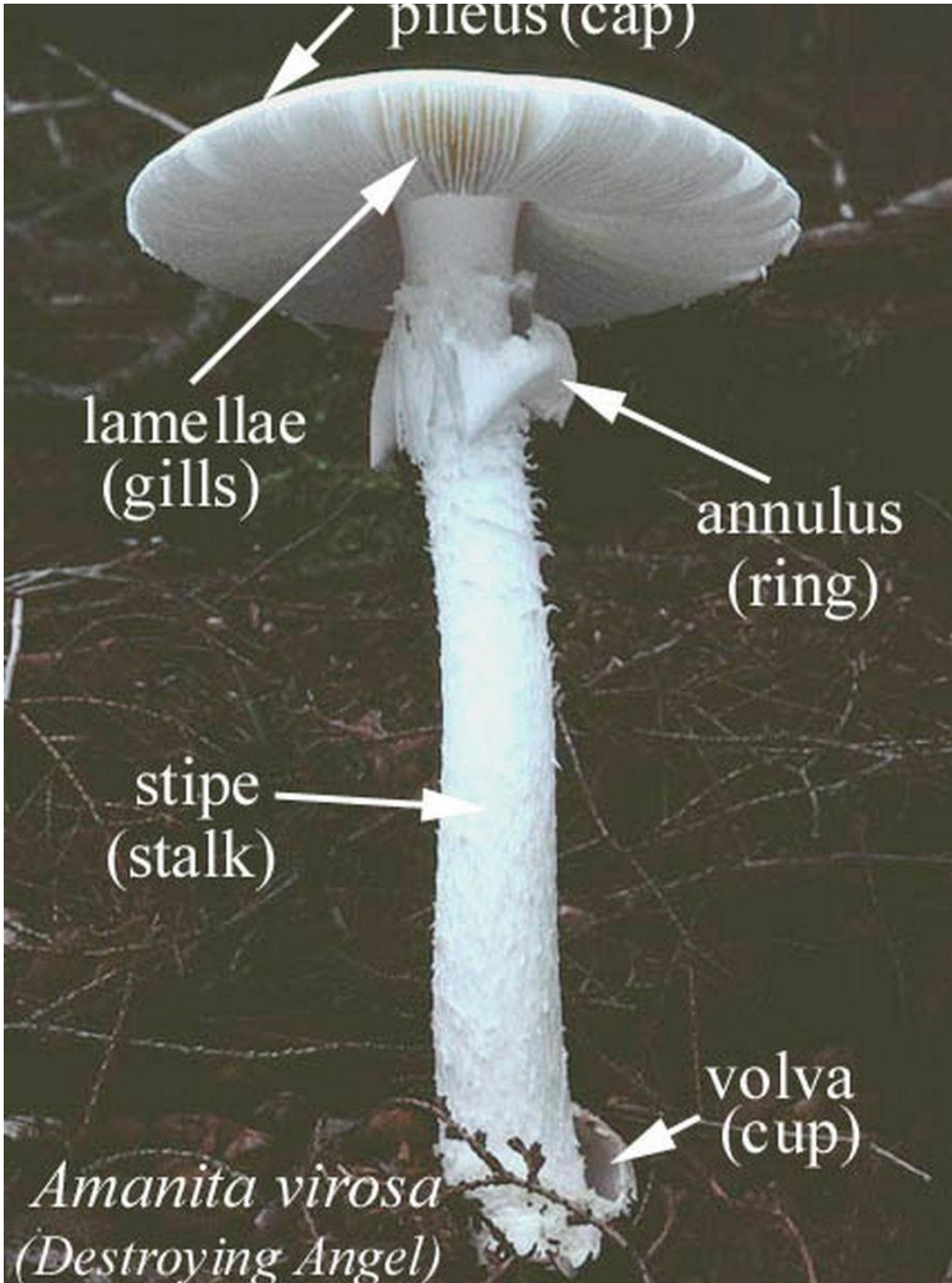
Hymenium is: free

Stipe has: a ring and volva

Spore print is: white

Ecology is: mycorrhizal

Edibility: deadly



Cap

Caps of the Destroying Angel are 5 to 10cm in diameter, pure white, and without any marginal striations. The cap is initially egg-shaped and then campanulate (bell shaped) or occasionally almost flat but with a broad umbo, and is often tilted on the stipe.

Although some young caps carry white remains of the universal veil, they soon wash off in wet weather and are rarely seen on mature caps.

Gills

Amanita virosa gills are white, free and crowded.

Stem

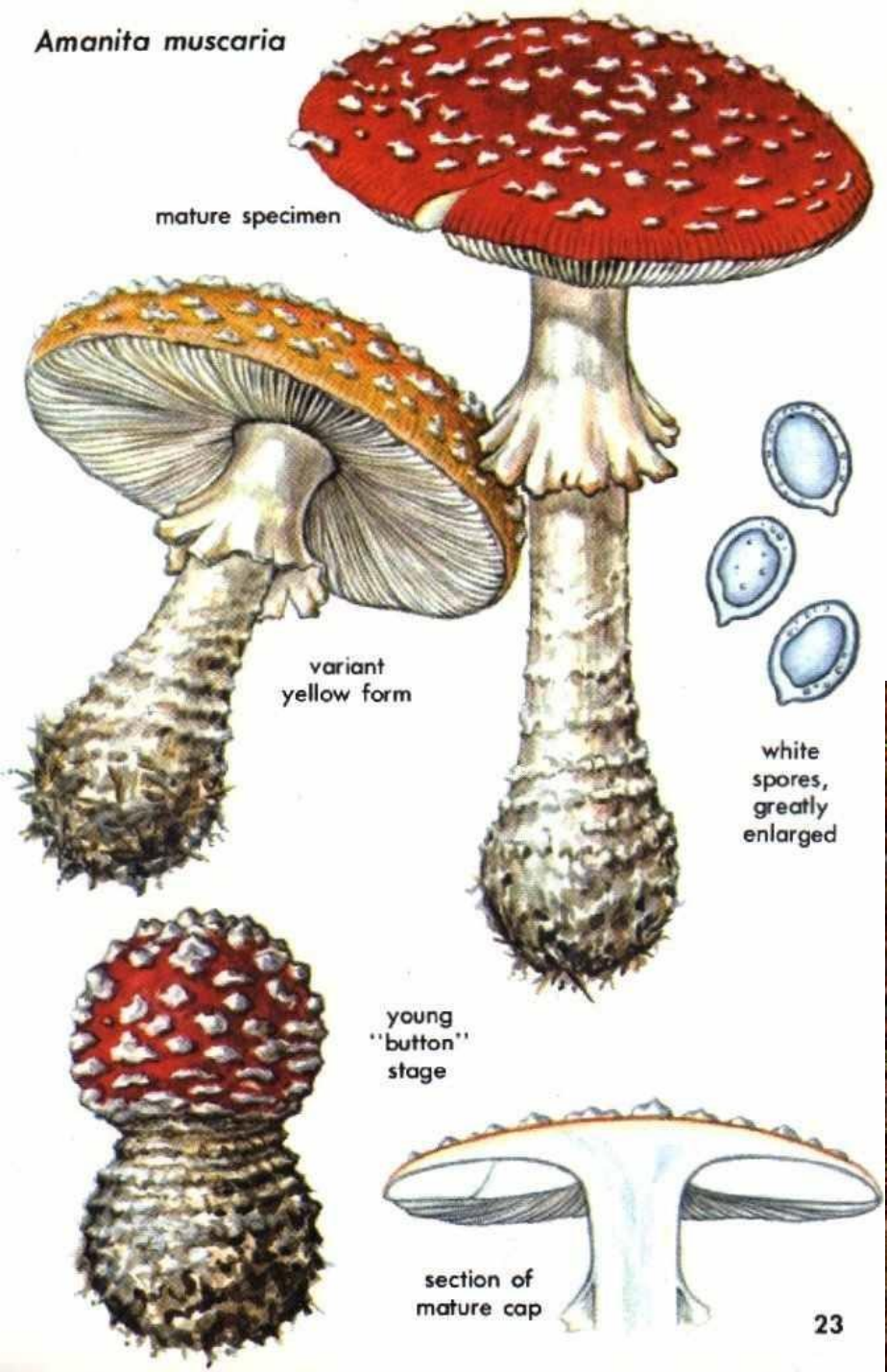
Stems of Destroying Angels are 9 to 15cm tall, 0.6 to 2cm in diameter, and often slightly curved; pure white and fibrous with an ungrooved, fragile ring high up on the stipe.

The large, sack-like volva i

Amanita verna

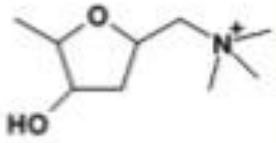
Amanita muscaria (FLY AGARIC)

Amanita muscaria



Compounds exerting neurologic effects: Muscarine

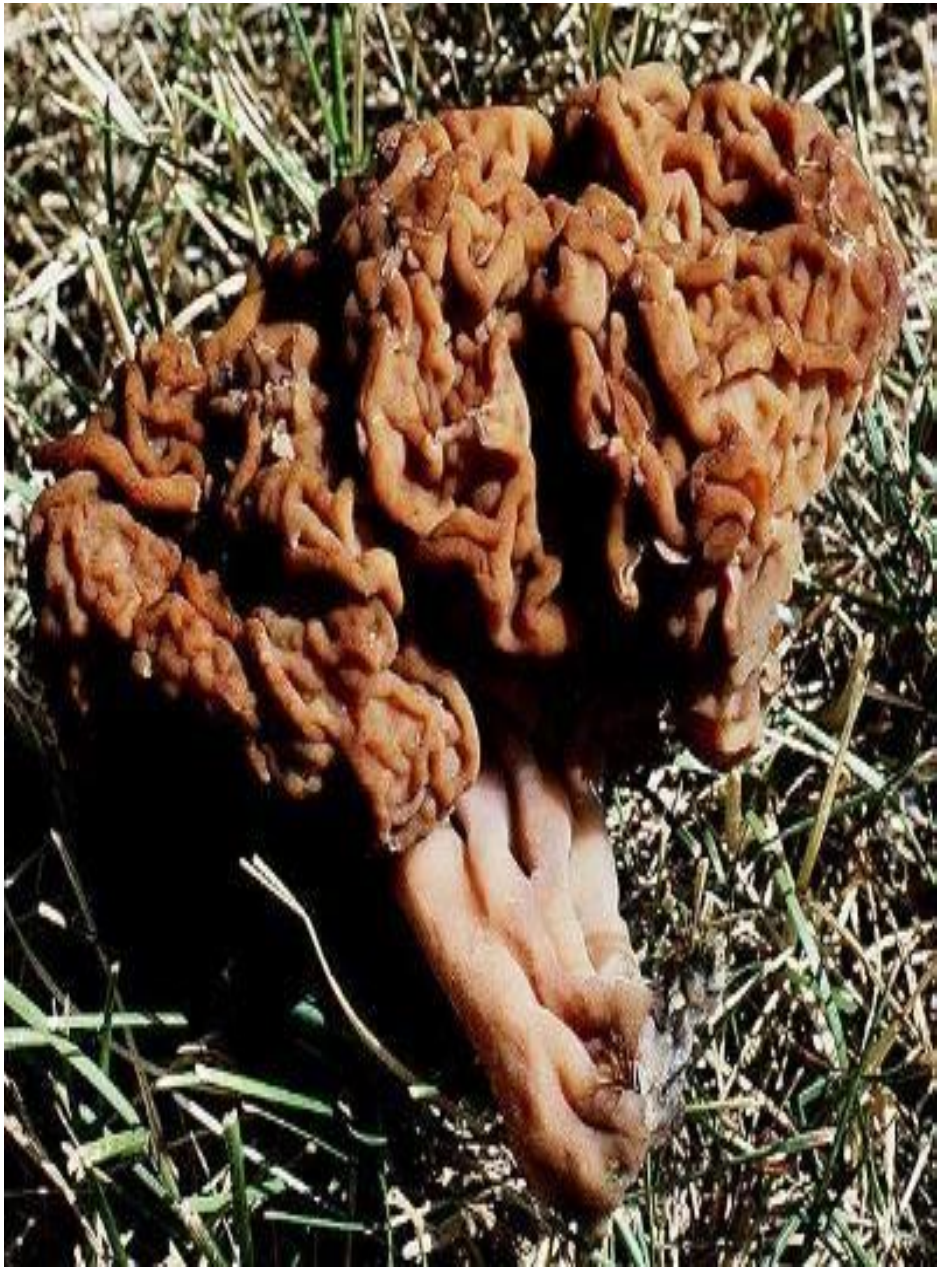
- Source: ***Amanita muscaria, Amanita pantherina, Boletus, Lepiota, Hebeloma, Russula, Clitocybe, Inocybe*-brownish spores**
- Symptoms: increased salivation, perspiration, lacrimation, abdominal pain, sever nausea, diarrhea, slow pulse, asthmatic breathing, constricted pupil.
- Treatment: Gastric lavage and administration of atropine, a specific antidote.

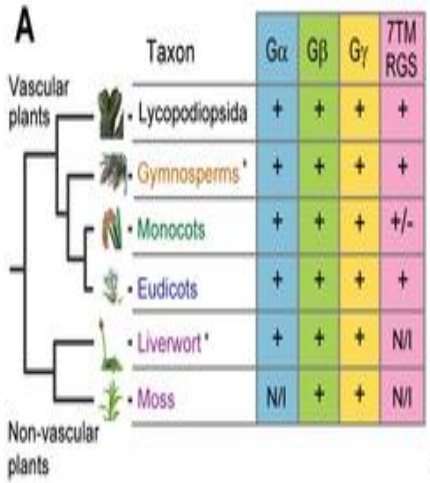


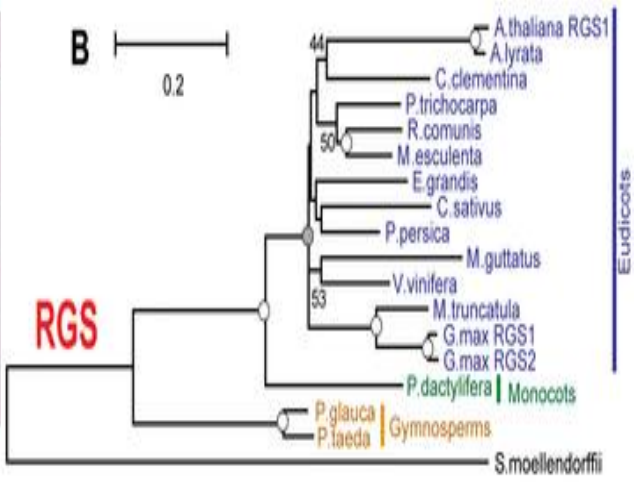
Muscarine

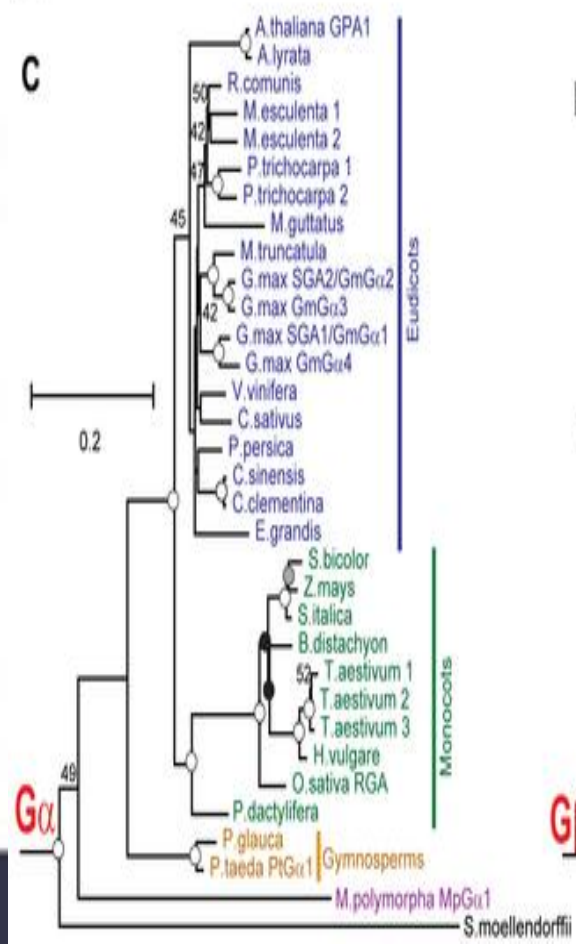
Amanita pantherina

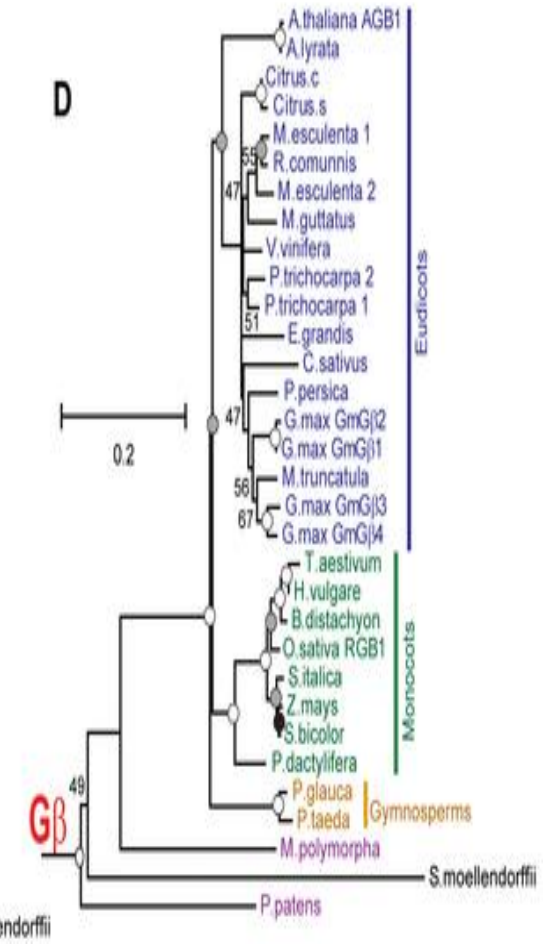
Gyromitra esculenta











Inocybe rimosa

Galerina marginata

Cortinarius orellanus

Galerina marginata

Boletus calopus

Galeria nagrzyby

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توجه
شما
سپاسگزارم

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