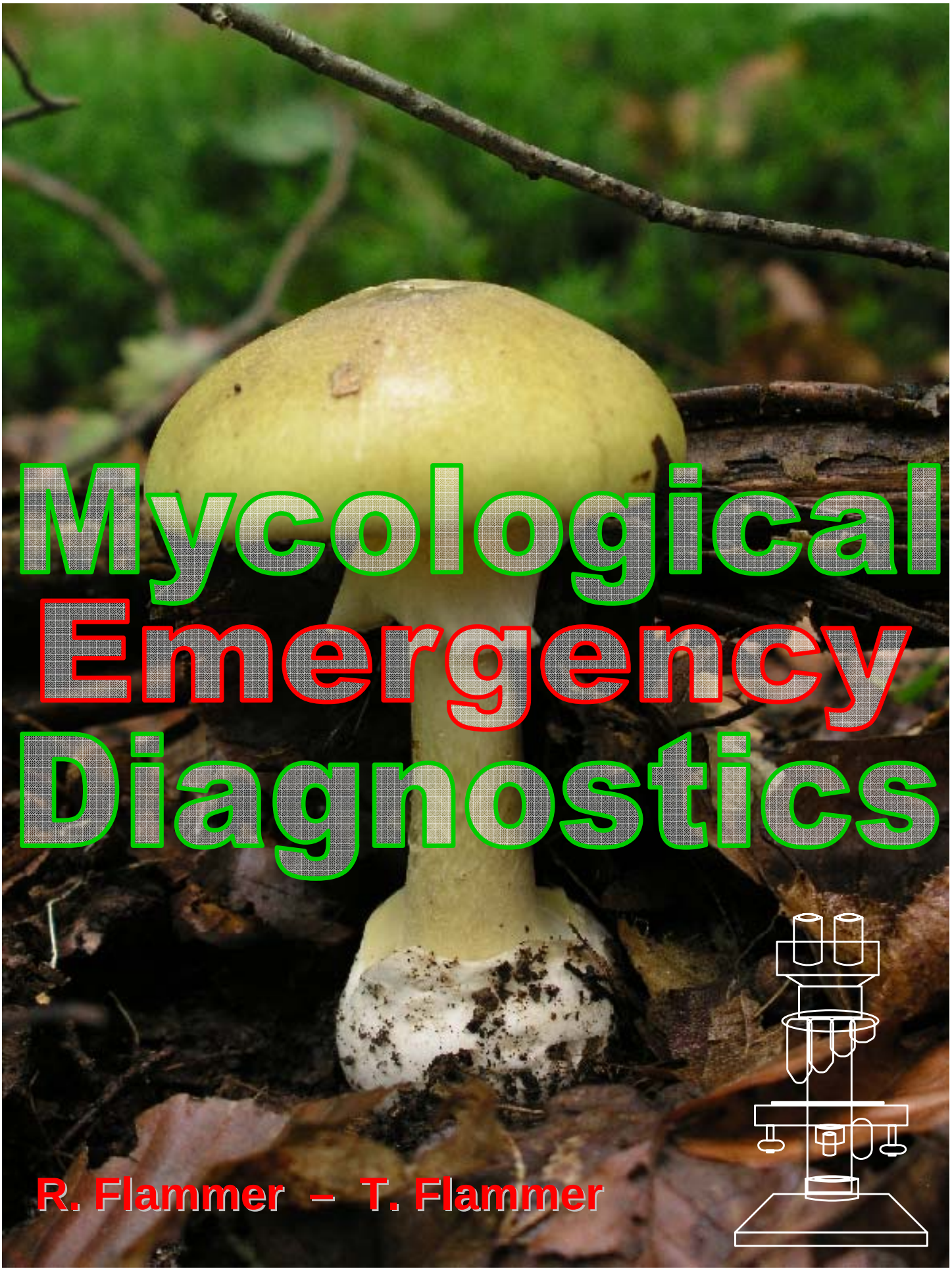

Mycological Emergency Diagnostics

R. Flammer – T. Flammer

Index

Index 2
Foreword 3
Emergency kit 4
Optional kit 5
Spore analysis 6
1) Fresh material, preparation residues 6
2) Cooking residues, remnants from cans, jars, etc. 6
3) Dry material 6
4) Gastric juices, vomit 7
5) Stools 8
Chemical Test methods 9
1) ELISA test for amanitin 9
2) Newspaper-Test according to Wieland 10
3) Orellanin-Test according to Pöder und Moser 11
4) Haemagglutination-Test according to Lefèvre 12
Spore tables 13
1) Table A – hyaline, inamyloid spores 14
2) Table B – hyaline, inamyloid spores 15
3) Table C – hyaline, inamyloid spores 16
4) Table D – amyloid Spores 17
5) Table E – dextrinoid Spores 18
6) Table F – brown spores 19
7) Table G – brown spores 20
8) Table H – black spores 21
9) Table I – spores, basidia, asci 22
10) Table K – Cystidia 23
Identification tips 24
1) Spores 24
2) Spore powder 24
3) Basidia 25
4) Cheilocystidia 25
5) Pleurocystidia 25
6) Chrysocystidia 25
7) Marginal cells 25
8) Cap cuticle 25
Chemical Reactions 27
1) $FeSO_4$ 27
2) KOH 20% 27
3) NH_3 27
4) Schäffer-reaction 28
5) Further staining- & Test methods 28
   - Cresyl Blue / Toluidin Blue O 28
   - Patent-Blue V 28
6) Primordial hyphae 29
7) Siderophile Granulation 30
Brief portraits of the 18 syndromes 31
The syndromes, their toxins and their target organs 33

Appendix: Table of first symptoms and latency periods 34

Foreword

Fungal collection inspectors do not have microscopical skills or medical knowledge, so that emergency experts, with the help of microscopy, and especially spore analysis, are needed to determine which of the **18 poisoning-syndromes** conforms to initial symptoms and latency period

The purpose of this course is to further interdisciplinary co-operation between medicine and mycology, and to demonstrate possibilities and limitations of mycological emergency diagnoses.

Often one must be satisfied by only circumstantial evidence, even when knowledgeable mycologists are involved.

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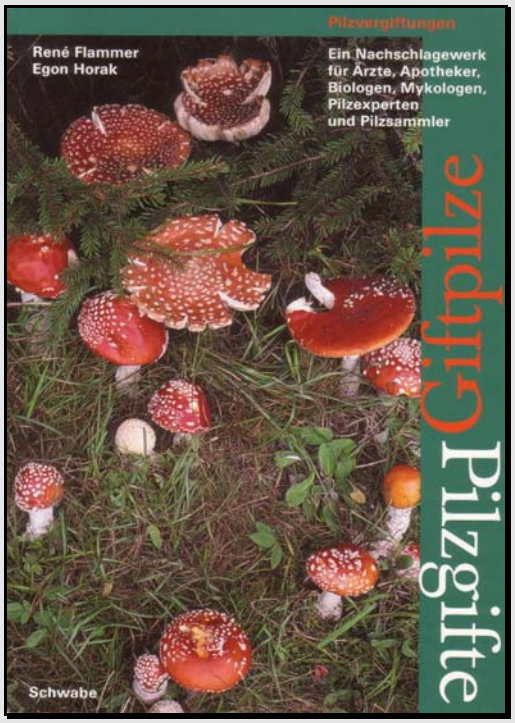
Further reading – Bibliography with 149 references

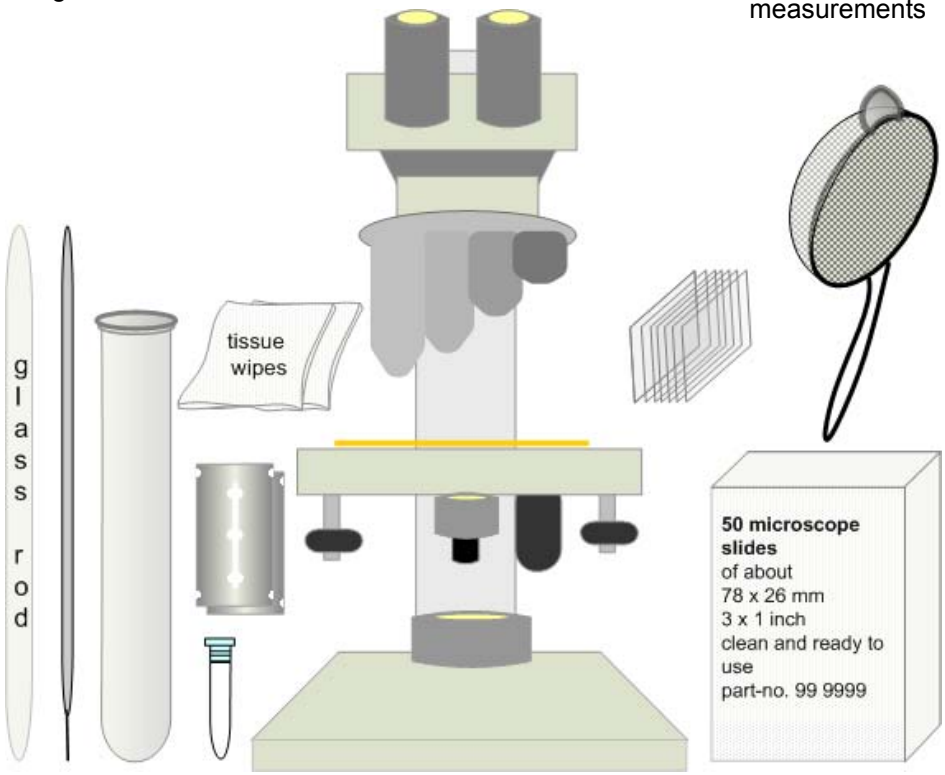
Flammer R, Horak E, Giftpilze – Pilzgifte, Schwabe Basel 2003, ISBN 3-7965-2008-1



Emergency kit

Substance	Formula		Application
Caustic potash	KOH	3 - 5 %	For tissue maceration and softening dry material
Melzer Reagent	dist. water Potassium iodide Iodine Chloral hydrate	20 ml 1.5 g 0.5 g 22 g	Testing for amyloid or dextrinoid behaviour
Hydrochloric acid	HCl	30 %	For the newspaper test
Iron chloride	$FeCl_3 .6H_2O$ HCl 0.5 mol	0.6 g 20 ml	Orellanin-determination
Immersion oil			Magnification 1 : 1000
Ethanol		70 %	Cleaning optical components

- Glass slide
- Cover slips
- Paper tissues
- Glass rod
- Rubber gloves
- Scalpel, razor blades
- Coffee sieve
- Microscope with x100 objective und graduated eyepiece
- Glass test tubes for working with ether
- Plastic reagent tubes for other tasks
- Literature for following up measurements



Information on Institutes that carry out the ELISA test (Amanitin presence in urine, serum, plasma).

Country		Telephone / emergency numbers
Switzerland	Toxicology Centre Zurich	from Switzerland 145 from outside Switzerland +41 44 251 51 51
Other countries	Complete with the corresponding emergency numbers	

5) Stools

Visible fragments present

- Stool soaked with 10 times its quantity of water, and filtered through a coarse sieve.
- Look for fragments in the residue.
- Wash fragments in hot water.
- Alternative: Degrease in coffee sieve with washing-up liquid from a spray bottle, with the sieve placed above a large vessel to avoid loss of material from foaming during the washing process.
- Examine under the microscope.

Visible fragments missing

- Add 5 ml ether to 5 ml of the filtrate (degreasing) and shake well.
- Pipette off the ether layer.
- Centrifuge the aqueous phase for 10 Minutes at 7000 rpm.
- Decant supernatant liquid down to the sediment.
- Examine sediment microscopically after lightly drying a drop over a flame.

Care, use only glass vessels when working with ether!!

Comment

These methods are very time-consuming and mainly have a place in forensic medicine.

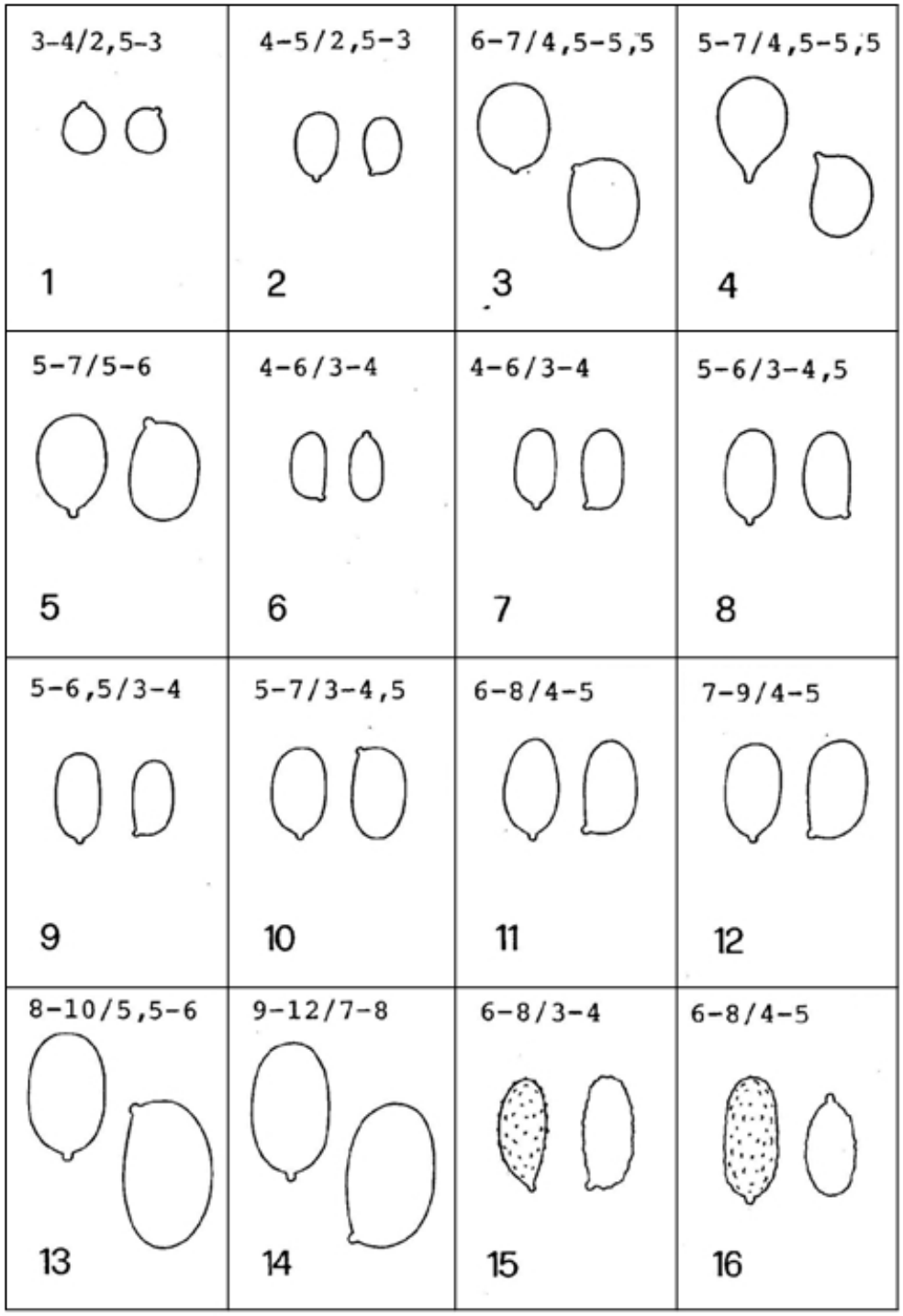
Fungal fragments and spores remain present in stools for up to 5 days following a fungal meal. Theoretically one could examine stools for determining Orellanus-syndrome. However the number of similar Cortinarius spores negates this as a confirmation character.

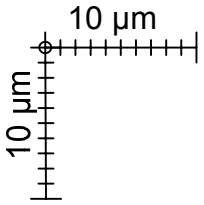
Confirmation of Orellanus-syndrome is by the test according to Pöder und Moser and detection of the toxin in kidney needle biopsy tissue. This is possible for several weeks following a fungal meal, using thin-layer chromatography (page 11).

Cortinarius rubellus

1) Table A – hyaline, inamyloid spores

Scale / Notes





1 *Albatrellus subrubescens*
Albatrellus ovinus
2 *Clitocybe rivulosa*
Clitocybe phyllophilla
(cerussata)
3 *Pluteus atricapillus*
4 *Clitocybe geotropa*
5 *Omphalotus olearius*
Hydnum repandum
Clitocybe dealbata
6 *Collybia fusipes*
7 Calocybe gambosa
8 *Tricholoma albobrunneum*
Tricholoma saponaceum
Tricholoma portentosum
9 *Lentinus edodes*
10 *Tricholoma fulvum*
Clitocybe clavipes
Sparassis crispa
Clitocybe suaveolens
11 *Tricholoma equestre*
12 *Hygrophorus marzuolus*
13 *Tricholoma tigrinum*
14 *Amanita pantherina*
15 *Lepista nebularis*
16 *Lepista nuda*

Brief portraits of the 18 syndromes

This working booklet is no substitute for more comprehensive works of reference. It is a brochure for use in emergencies **Page 34 summarises** what a fungus-expert needs to know. The division into individual syndromes is partly artificial as nature often resists our efforts to define tidy boundaries in attempts to classify matters. Seamless transitions and exceptions must always be borne in mind. Experience has shown, however, that summaries in tabular form provide an essential and useful rough screening function within the framework of a rapid initial orientation. **Symbols:** basically all the syndromes can cause serious, even if not fatal outcomes. All depends on quantity of toxin, therapeutic latency time (time from first symptoms to the beginning of treatment), age, etc. The crosses should therefore be seen a rough guide, in which the probability of a fatal outcome or permanent damage to organs correlates to the number of crosses shown.

Phalloides-Syndrome † † † † Latency > 4 hours. Victims suffering vomiting and diarrhoea are always frightened of potential amanitin-poisonings. Resolving this question quickly is of the utmost priority. Do not rely on statements by the patient, whose mycological knowledge is unlikely to be helpful. Do not forget that small *Lepiota*-species and especially *Galerina marginata* (wood chippings in woodland and garden) also contain amanitin. Take into account unusual timings in poisoning episodes (deep-frozen and dried fungi).

European toxic fungi		**North America**
Amanita phalloides	*Lepiota brunneoincarnata*	*Amanita bisporigera*
Amanita verna	*Lepiota josserandii*	*Amanita ocreata*
Amanita virosa	*Lepiota brunneolilacea*	
Galerina marginata	7 further, difficult to differentiate species	
Galerina autumnalis		

Acromelalgy-Syndrome † Pain and swelling in the hands and feet 1-2 days following consumption of *Clitocybe amoenolens* und *Clitocybe acromelalga* (Japan). Rare.

Coprinus-Syndrome † Inkcaps and alcohol are not compatible. Acute symptoms can occur up to 4 days after a fungus meal very shortly after any alcohol is consumed. Very infrequently an Antabuse reaction can occur after (generous?) partaking of *Coprinus comatus?* Coprine has also been found in *Boletus torosus*, whilst *Boletus luridus* is toxin-free.

Equestre-Syndrome † † † Muscle disintegration after eating *Tricholoma equestre*. Toxicologically many questions remain open, as apparently poisonings occur only infrequently. Individual factors? Variable toxin content in the fungi? Critical stimulation threshold exceeded by generous quantities and repeated consumption? Rare. Latency > 24 hours.

Fungal allergy † Often difficult to separate from indigestibility and gastrointestinal early-syndrome. Indicators are skin rashes, asthma, mucus membrane swellings and circulatory collapse, also constitutional tendency to allergies with corresponding case histories.

Gastrointestinal Early-syndrome † † Several dozen toxin-containing fungi cause vomiting and diarrhoea, most of which show short latency periods of less than 4 hours.

The most frequently found toxic fungi		**USA, Tropics & Subtropics**
Agaricus xanthoderma	*Omphalotus olearius* [1)]	*Chlorophyllum molybdites*
Boletus satanas	*Paxillus involutus*	
Entoloma sinuatum	*Ramaria formosa*	
Hebeloma sinapizans	*Ramaria pallida*	
Hypholoma fasciculare	*Russula* (hot species)	
Lactarius (hot species)	*Tricholoma saponaceum*	
Macrolepiota venenata [1)]	*Tricholoma tigrinum* [1)]	[1)] Unknown or rare in Great Britain