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2000 Annual Report of the North American Mycological Association Mushroom Poisoning Case Registry

see http://www.namyco.org/

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Sixty six cases were reported to the Registry for the year 2000, involving 61 human cases and 5 in dogs. No fatalities were reported. Cases were reported for only 18 US states and no Canadian provinces. Such limited reporting is an inherent defect of the voluntary nature of reporting to the Registry, and should be kept in mind in considering the data. The volunteers submitting reports are to be commended and are gratefully acknowledged. *

Table 1 lists some characteristics of the cases received for the year 2000 and the totals for the Registry from its formation in 1983 through 2000. Overall, reports have been received from 47 states and the District of Columbia and from the provinces of Alberta, British Columbia, Nova Scotia, Ontario, Quebec, and Saskatchewan. Two early reports from Mexico are not listed in Table 1. Sources of the cases for 2000 are listed in Table 2

Table 1
Summary of Cases

	2000	Total
Cases	66	1800
States reporting	18	48[1]
Provinces reporting	0	6[2]
Human Cases	61	1795[3]
Animal Cases	5	85
Dog	5	68
Cat	0	17
Mushroom IDs	-	-
Good	28	979
Probable	7	131
Possible	7	86
Genus only	7	178

compared to 201 in year ending 6/30/87 (see next pg)

for more data see 2000 complete report at clark web site or NAMA web site named above!

Mixed species	8	208
Unknown species	9	298

[1]Reports not received from AL, DE, SD
[2]Reports received from AB, BC, NS, ON, QC, SK
[3]Demographics in Table 3

Table 2
Sources of Cases-2000

State	Cases
AK	2
AR	3
CA	5[1]
CO	9[1]
IA	1
ID	9[2]
MD	1
ME	3
MT	4
NC	1
NV	1
NY	3
OH	2
OR	8
TX	1
VA	1
WA	7
WV	2

[1]Includes 2 dogs
[2]Includes 1 dog

Demographics are summarized in Table 3; Tables 4 and 5 present information on children and adults.

Table 3
Demographics (Human Cases)

	2000	Total
Adult Cases	45	1390
Fatal	0	17
Male	22	674
Median age, years	42	36
Female	18	422
Median age, years	39	44
Unknown gender	5	293
Child Cases	16	404
Fatal	0	1
Male	8	192
Median age, years	6.5	4
Female	7	165
Median age, years	3.5	3.5
Unknown gender	1	47
Human age? & gender?	0	1

Table 4
Cases in Children- Year 2000
N=16

Purpose	Age	Sex	Prep	Species	State

accident	0.7	F	raw	*Psathyrella longipes/candolleana*	CA
accident	1.3	F	raw	*Panus conchatus*	CA
accident	1.5	M	raw	*Inocybe sp.*	ME
accident	2	F	raw	*Leucoagaricus naucinus*	WA
accident	3.7	M	raw	*Psathyrella velutina*	NC
accident	5	M	raw	*Inocybe sp.*	WA
accident	5	F	raw	*Agaricus xanthodermus*	ID
accident	8	M	raw	*Mycena sp.*	CA
accident	10	Unknown	raw	*Chlorophyllum molybdites*	IA
recreation	?teen	M	raw	Sp. unknown- *?cyanescens*	OR
recreation	teen	M	raw	*Amanita muscaria*	WA
recreation	teen	F	raw	*Amanita muscaria*	WA
recreation	15	M	raw	*Amanita muscaria*	WA
recreation	15	F	raw	*Amanita muscaria*	WA
recreation	15	M	raw	*Psilocybe stuntzii*	OR
recreation	15	F	raw	*Psilocybe stuntzii*	OR

Table 5
Cases in Adults- Year 2000
(age 16+, N=45)

Purpose	Age	Sex	Prep	Species	State
food	?	F	cooked	*Omphalotus olearius*	ME
food	?	?	cooked	*Omphalotus olearius*	NY
food x4	?	?	cooked	*Omphalotus olearius*	NY
food	?	M	cooked	*Morchella sp. + Gyromitra sp.*	MT
food	?	M	cooked	*Morchella sp. + Gyromitra sp.*	ID
food	16	M	raw	Sp. unknown LBM	MT
food	17	M	raw	*Chlorophyllum molybdites*	CO
food	20	F	raw	*Morchella/Gyromitra sp*	ID
food	21	F	cooked	*Cantharellus formosus + Laetiporus sulphureus*	OR
food	21	F	cooked	*Cantharellus formosus + Laetiporus sulphureus*	OR
food	25	M	cooked	*Amanita muscaria*	OR
food	25	F	raw	*Gyromitra sp.*	ID
food	28	M	cooked	*Pleurotus ostreatus*	OR
food	29	F	cooked	*Morchella sp. + Gyromitra sp.*	MT
food	39	F	cooked	*Gyromitra esculenta*	AK
food	44	F	cooked	*Leccinum + Lycoperdon*	AK

food	44	F	raw	*Morchella/Gyromitra sp*	ID
food	45	M	cooked	*Omphalotus olearius*	ME
food	45	F	cooked	*Omphalotus olearius?*	WA
food	53	M	cooked	*Omphalotus olearius*	NY
food	53	M	raw	*Amanita muscaria*	WV
food	55	F	raw	*Omphalotus olearius*	MD
food	56	F	raw	*Agaricus xanthodermus*	CO
food	62	M	cooked	*Amanita muscaria*	OH
food	62	F	cooked	*Morchella sp. + Gyromitra sp.*	ID
food	70+	M	cooked	*Amanita muscaria*	OH
food	72	M	cooked	*Amanita muscaria*	WV
food	73	F	cooked	*Agaricus xanthodermus* complex	ID
food	74	F	cooked	*Morchella sp.*	ID
food	78	M	cooked	*Russula claroflava /ochroleuca /lutea*	VA
recreation	17	M	raw	Sp. unknown	TX
recreation	17	F	raw	*silocybe sp.*	OR
recreation	18	M	raw	Sp. unknown	CO
recreation	20	M	unknown	Sp. unknown	MT

recreation?	20	F	unknown	*Amanita muscaria*	CO
recreation?	24	M	unknown	*Amanita muscaria*	CO
recreation?	26	F	unknown	*Amanita muscaria*	CO
recreation?	27	M	unknown	*Amanita muscaria*	CO
recreation?	39	M	raw	Sp. unknown	NV
recreation	48	M	raw	*Collybia? sp.*	AR
recreation	48	M	raw	*Galerina autumnalis*	AR
research	48	M	raw	*Amanita virosa/bisporigera*	AR

Table 6
Species Summary- 2000

Species	Cases	Location	Adult	Chil
Human Cases- identified single species[1]				
Amanita muscaria	13	CO, WA, 4; OH, WV, 2; OR, 1	9	4
Omphalotus olearius	9	NY, 6; ME, 2; MD, 1	9	
Agaricus xanthodermus	2	ID, 2	1	1
Psilocybe stuntzii	2	OR, 2		2
Chlorophyllum molybdites	1	IA		1
Gyromitra esculenta	1	AK	1	

Leucoagaricus naucinus	1	WA		1
Panus conchatus	1	CA		1
Pleurotus ostreatus	1	OR	1	
Psathyrella velutina	1	NC		1
Human Cases- mixed species				
Morchella sp. + *Gyromitra sp.*	4	ID, 2; MT, 2	4	
Cantharellus formosus +*Laetiporus sulphureus*	2	OR, 2	2	
Leccinum sp. +*Lycoperdon sp.*	1	AK	1	
Human Cases- species identification uncertain				
?Agaricus xanthoderma	1	CO	1	
Amanita ?virosa/bisporigera	1	AR	1	
?Chlorophyllum molydites	1	CO	1	
?Galerina autumnalis	1	AR	1	
?Omphalotus olearius	1	WA	1	
Psathyrella ?longipes/candolleana	1	CA		1
Russula ?claroflava/ ochroleuca/lutea	1	VA	1	

Human Cases- genus only identified				
Inocybe sp.	2	ME, WA		2
Collybia sp.	1	AR	1	
Gyromitra sp.	1	ID	1	
Morchella sp.	1	ID	1	
Mycena sp.	1	CA		1
Human Cases- unknown species				
Species unknown	9	ID, 2; AR, CA, CO, MT, NV, MT, TX	8	1
Animal Cases- 5 dogs				
Amanita pantherina	1	CO		
Bolbitius vitellinus	1	CA		
Trametes versicolor	1	CA		
Gyromitra sp.	1	CA		
?Marasmius oreades +Species unknown	1	CO		

[1]Combined identifications judged good or probable

Most of the mushroom species listed in Table 6 had also previously been reported to the Registry three or more times (Cochran, 2000, and literature cited therein). The ingestion of a mushroom, particularly a collected wild species, is apt to be a memorable event. especially by a hunter/mycophagist. A subsequent unfortunate experience may then be attributed to the mushroom's toxicity rather than to possible microbial or chemical contamination before or during preparation or to concurrent infection. A single incident, therefore, may arouse suspicion but should not necessarily condemn a mushroom as toxic; and the attribution of symptoms in mixed ingestions is conjectural.. *Panus conchatus*, reported to the Registry for the first time, was ingested by an infant reported as asymptomatic, but who was treated with ipecac at the recommendation of the poison center. In the reported single human case involving *Psathyrella velutina* in 2000, a

3-year-old male merely suffered hiccups, while an earlier case in 1987 remained asymptomatic but was also treated with ipecac. The data leave the toxicity of these species uncertain. Two cases of *Psilocybe stuntzii* were reported, but only 1 of the 2 teenagers sampling *P. stuntzii* (and alcohol) experienced symptoms (vomiting). However, some collections have been reported to contain psilocin/psilocybin (Beug et al., 1982). *Trametes versicolor*, reported for the first time, but in a dog (vomiting), seems an unlikely object for human ingestion.

Misidentifications were reported in 14 cases. Ten involved confusion of *Omphalotus olearius* with species of *Cantharellus*, the misidentification most often reported to the Registry. Amanita muscaria was collected in each of 3 cases when the intended species were *Macrolepiota procera*, *matsutake*, and "pinky" (*Agaricus campestris*?). This is the first time *Amanita muscaria-M. procera* confusion has been reported. While the recreational users experienced "bad trips", it may be noted from Tables 4 and 5 that the teenagers and twenty-somethings generally made more informed choices of mushroom species.

Discussion

The major disadvantage with the Registry's data is the limited participation in reporting cases. Advantages are the proportion of cases were the mushroom is identified. These factors were discussed in the previous annual report and preceding reports. Efforts to increase participation continue, including outreach to mycological organizations and a website <www.sph.umich.edu/~kwcee/mpcr> . The present state of participation in the Registry's activities conforms to part of the aphorism that not everything that counts can be counted (Einstein, A.)

Literature Cited

Beug, M.W. and Bigwood, 1982. Psilocybin and psilocin levels in twenty species from seven genera of wild mushrooms in the Pacific Northwest. J. Ethnopharmacol. 5:271-85.

Cochran, K.W., 2000. 1999 Annual report of the North American Mycological Association's Mushroom Poisoning Case Registry. McIlvainea 14(2):34-40.

Einstein, A. "Not everything that can be counted counts, and not everything that counts can be counted."

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Table 1 Compounds Probably Involved in Mycotoxicoses

Toxin	Producing fungi	Susceptible host	Biological effects
Aflatoxins	*Aspergillus flavus, A. parasiticus*	Mammals, fish	Hepatotoxin, cancer
Penitrem A	*Penicillium palitans, P. crustosum*	Cattle, horses, sheep	Tremorgenic, convulsant
T-2	*Fusarium tricinctum*	Cattle, humans?	Dermal necrosis, hemorrhage
F-2	*Gibberella zeae*	Swine	Vulvovaginitis, abortion
Slaframine	*Rhizoctonia leguminicola*	Cattle	Excess salivation
Sporidesmins	*Pithomyces chartarum*	Swine, sheep	Hepatotoxin, facial eczema
Ochratoxin A	*Penicillium viridicatum, A. ochraceous*	Swine, humans?	Nephrotoxin
Psoralens	*Sclerotinia sclerotiorum*	Humans	Dermotoxin
Citrinin	*P. viridicatum, P. citrinum*	Swine	Nephrotoxin
Vomitoxin	*F. graminearum*	Swine, humans?	Vomiting
Maltoryzine	*A. oryzae*	Cattle	Death
Unidentified	*Phomopsis leptostromiformis*	Sheep	Hepatotoxin
Diplodiatoxin	*Diplodia maydis*	Cattle, sheep	Nephritis, mucoenteritis
Unidentified	*Phoma sorghina*	Humans	Hemorrhage, bullae mouth, rapid death
Secalonic acids D, F	*Penicillium oxalicum*	Humans	Death
Satratoxins	*Stachybotrys atra*	Horses, humans	Hemorrhage

Table 2 Other Compounds Suspected of Being Mycotoxins

Toxin	Producing fungi	Possible host	Biological effects
Sterigmatocystin	*Aspergillus flavus*	Mammals	Carcinogen
Yellow rice toxins			
Luteoskyrin	*Penicillium islandicum*	Humans	Hepatotoxin
Cyclochlorotine	*P. islandicum*	Humans	Hepatotoxin
Citreoviridin	*P. citreoviride*	Humans	Neurotoxin
Rugulosin	*P. rugulosum*	Humans	Carcinogen
Rubratoxin	*P. rubrum*	Cattle	Hepatotoxin
Fusaranon-X	*Fusarium nivale*	Humans, swine	Vomiting
Nivalenol	*F. nivale*	Humans, swine	Vomiting
Cytochalasin E	*A. clavatus*	Humans	Death
PR toxin	*P. roqueforti*	Cattle	Abortion
Patulin	*P. urticae*	Cattle	Death
Penicillic acid	*Penicillium* spp.	Farm animals	No data

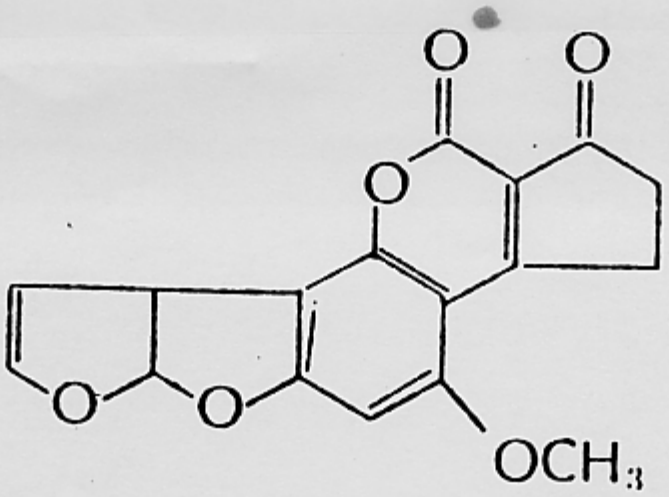
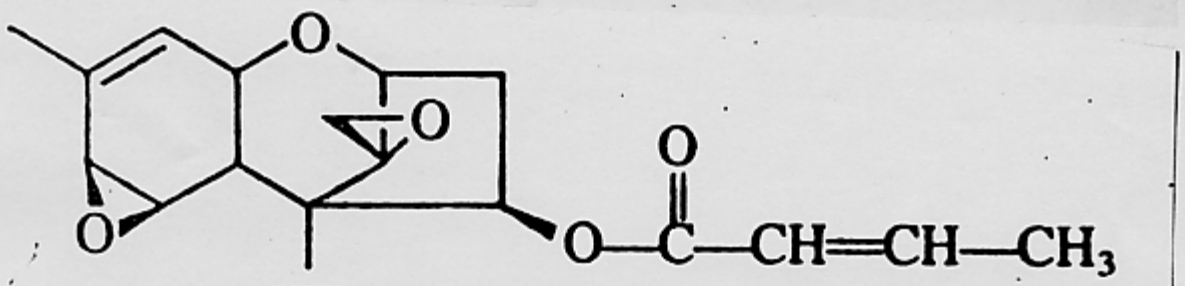


Figure 28–8. Chemical structure of aflatoxin B.



Trichothecenes

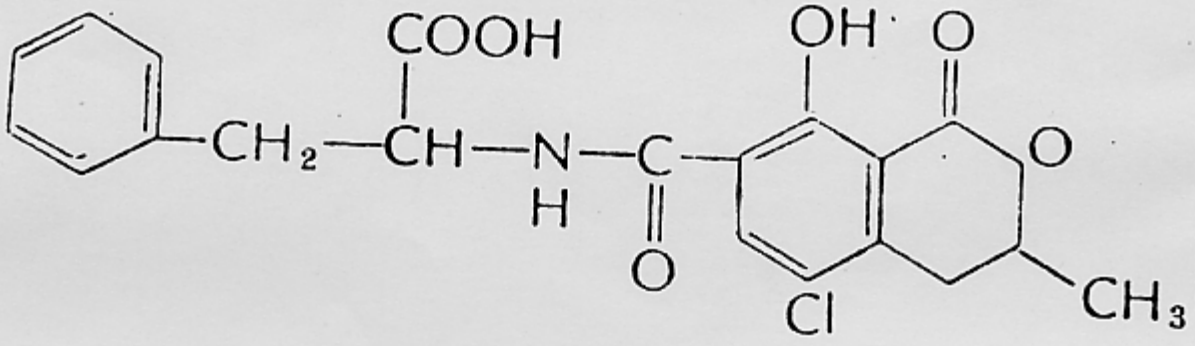


Figure 28–11. Ochratoxin A.