

NAMA Toxicology Committee Report for 2009

North American Mushroom Poisonings

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NAMA receives on average one report a year of a human death from mushrooms and rarely receives a report of a liver transplant due to mushroom poisoning. This year there were at least eleven and possibly 17 people who consumed mushrooms containing amatoxin including **four people who died**. One death each was attributed to a Destroying Angel (*Amanita bisporigera* or a look-alike), a Western Destroying Angel (*Amanita ocreata*), *Amanita phalloides* and *Lepiota subincarnata (josserandii)*. The person who died from *Amanita bisporigera* or a look-alike had received a liver transplant, but died a couple of weeks later of an *Aspergillus* infection in her lungs. One person who consumed *Amanita phalloides* would have died, but received a successful liver transplant. There is no proven antidote for amatoxin and in regions where good hospital care is not available, about 60% of the victims will die. But it is clear that excellent supportive care in a hospital can reduce the death rate to less than 15%, with the death rate falling well below 10% when a liver transplant is possible.

In the summer of 2009 Madaus Pharma initiated an FDA sanctioned open clinical trial of intravenous silibinin-Legalon-Sil extracted from the common milk thistle (*Silybum marianum*) (<http://clinicaltrials.gov/ct2/show/NCT00915681>). Injectable silibinin is a well established and approved treatment for amatoxin poisonings in Europe. Oral milk thistle preparations are poorly absorbed and thus impractical for clinical use in amatoxin poisoning (see www.bayareamushrooms.org/poisonings/index.html for more on this subject with photos and information by Debbie Viess).

In addition to the deaths from Amatoxins, there was one death where the ingestion of a *Leccinum* sp (broadly in the *aurantiacum* complex) caused a

serious enough reaction to be a contributing cause of death. Bill Bakaitis did truly heroic work in following up on the *Leccinum* case as well as in a case of mixed unknown mushrooms probably containing some Amatoxins. Any time a family member is lost to premature death it is a tragedy for the family. Reading the obituaries of the individuals made one realize the loss to their communities as well.

Other cases reported on 57 people with some form of GI distress, one person where mushrooms were an unintended sleep aid and one case of contact dermatitis. As usual the leading cause of poisoning was *Chlorophyllum molybdites* and some of those poisonings were very severe, resulting in blood in the stools and vomitus.

Also, as usual, Marilyn Shaw stayed available 24/7 via phone and contributed roughly 50 % of the reports, with human incidents from all reporters totaling 76 people.

We received the first report of a poisoning from *Gymnopus cf villosipes* and a question has been raised by the victim as to whether or not the mushroom could have caused certain ongoing problems. This case, a similar one involving morels, and other puzzling symptoms will be discussed in a "Mushroom Mysteries" article to be published separately.

In two cases individuals discovered their susceptibility to an edible species by multiple consumptions, each time with a faster and more violent reaction. If you have developed sensitivity to a mushroom you previously consumed with pleasure, we would especially like to hear about it as an article about mushroom sensitivity is in development. One or more people may want to have their personal story published so we also welcome those submissions.

For dogs, there were 13 poisonings reported with three, possibly four deaths attributed to

mushrooms. One dog death was probably due to ingestion of an *Inocybe* and these are known to kill dogs. One death was attributed to an *Amanita* in the *muscaria/pantherina* complex, though the symptoms do not fit well, and the mushrooms the owner presented as suspects were Chanterelles. A third dog death and a case suspected of resulting in a dog death involved liver damage, suggestive of amatoxin but no mushrooms were available for study.

While mushrooms have long been suspected in some unexplained horse deaths, this is the first year that mushrooms have been clearly tied to deaths in horses in any reports forwarded to NAMA. This year we received two confirmed reports of horse fatalities resulting from mushroom ingestion. One was the result of direct *Amanita phalloides* toxicity. One was due to colic as a result of ingestion of *Chlorophyllum molybdites*. In her email about the *Chlorophyllum molybdites* horse death, Sherry Kay pointed out

that since horses cannot throw up, mushrooms can pose a special problem for them. Sherry also mentioned that cattle frequently eat *Chlorophyllum molybdites* but with their many stomachs, seem to deal with it.

Two horse deaths were reported in one incident where mushrooms were strongly suspected and the paddock was observed to contain *Agaricus cf crocodilinus*, a *Gymnopus* and unidentified Ascomycete material). There was no direct evidence that any mushrooms had been consumed by either of the horses. When Dr. Joe Ammirati forwarded me an unusual report which involved a horse getting high on mushrooms (a humorous video of the horse “under the influence” was posted on the internet), and learned of the other horse poisoning reports, he declared this the “year of the horse”. From photos sent to him in the horse inebriation case, he was able to identify *Amanita muscaria* and *Panaeolus* (not a likely suspect) from the paddock.

Table I
Principal Poisonous Mushrooms Affecting Humans in 2009

Mushroom	# People	% of total Poisonings
<i>Chlorophyllum molybdites</i>	17	22.4
<i>Amanita muscaria</i> and <i>A. pantherina</i>	13	17
<i>Morchella spp</i>	6	7.9
<i>Amanita phalloides</i>	5	6.6
Total	41	54

Table II
Age Distribution of Affected Humans in 2009

Age Range	Male	Female	Unknown sex	% of Total Cases
<14	4	7		14.5
15-29 ¹	5	4		11.8
30-44	3	3		7.9
45-59	6	4		13
>60	6	3		11.8
Unknown Age	17	13	5	46

Table III

Human Mushroom Poisoning Details where Amatoxins were suspected or Confirmed

Mushroom Details And ID Confidence¹	When/Where	Sex/Age	Onset (hrs)	Symptoms and Comments²
<i>Amanita cf bisporigera!</i> Cooked 10 caps. Victim ID was <i>Lepiota naucina</i>	7/5/09 QB	F 65	~12	Nauseated, Liver Transplant , then DIED 7/24 of mush lung = Aspergillus complication
? <i>Amanita cf bisporigera?</i> Pic ID. Prep. U	6/20/09 MT	M Adult	5	Vomiting, non-stop bloody diarrhea, treatment refused
<i>Amanita cf ocreata!</i> Examined. Cooked ~1/3# Best mushroom meal ever	2/28/09 CA	M 82	24	Vomit, diarrhea, liver damage. Considered for transplant. DEATH.
<i>Amanita cf ocreata</i> Pic consistent with ID One tasted raw & cooked	3/09 CA	M 52	~12	Abdominal cramps, nausea, vomit, diarrhea for 48+ hrs, elevated LFTs. IV-silibinin
<i>Amanita phalloides!</i> No quantity or cooking details available	11/23/09 9 CA	M,2F Adult 30s	?	M: severe blood thinning, elev LFTs, renal failure. 2F: doing better until day 7 then 1 Liver Transplant, 1 DEATH
<i>Amanita phalloides!</i> Mushrooms examined. Quantity? Cooked.	10/16/09 9 MA	F,M Elder, son	?	Female far sicker – severe coagulopathy. IV-silibinin. Both recovered in 5 days
<i>Lepiota josserandii/ subincarnata</i>	Summer 2009 NY	? ?	? ?	DEATH
<i>Lepiota josserandii/ subincarnata!</i> mushroom in her mouth	7/29/09 QB	F 3	-	Rushed to the hospital for charcoal + IV saline, no symptoms developed.
<i>Amanita? Hygrophorus?</i> From microscopy of food. Cooked, tasted, frozen, recooked later with garlic to see if garlic blackens	11/3/09 NY	2M,F Adult Then +2F Adult + Girl	~12 hr ~36hr	Diarrhea (3), vomiting (3), elevated LFTs (1), bladder infect (1). 24 hr later diarrhea (2 more), vomiting (3 more), mild increase LFTs (1 more)

¹species! = examined by expert; ?genus = genus is a best guess; species? = species is a best guess; cf = conforms to ID but look-alikes with same toxic effects exist; no symbol = reliable ID from a good photo, etc but no known microscopy.

²Elevated LFTs = evidence of liver damage; coagulopathy = severe blood thinning; IV-silibinin = intravenous silibinin-Legalon-Sil as part of FDA sanctioned IND.

Table IV

Other Reports of Adverse Human Incidents from Mushrooms 2009

Mushroom Details and ID Confidence¹	When/Where	Sex¹/Age	Onset (hrs)	Symptoms and Comments²
<i>Agaricus xanthodermus</i> Plus edible <i>Agaricus sp</i>	6/16/09 CO	M Adult	?	GI distress
<i>Agaricus xanthodermus?</i> found in yard	9/22/09 MT	F 1	6?	Vomiting and diarrhea. No evidence a mushroom was eaten
<i>Amanita muscaria</i> cooked mushrooms, M "a lot", also fed to dog = sick dog	9/10/09 MI	M,F adult	~1	Vomit, diarrhea, sweating, bradycardia; pupils constricted as if muscarine involved
<i>Amanita muscaria!</i> Almost half bag eaten cooked	10/10/08 PA	F 80	2-3	Disorientation, vomit, nausea, bradycardia, coma, intubate, ventilation, epileptic seizures
<i>Amanita pantherina or muscaria!</i> cooked. Terrified by amatoxin warning from nurse	8-12-09 MT	M 51 F 47 F 53	0.5	2 Vomit, trouble walking, male combative, confused, sedated, restrained. One ± unaffected ate 1/3 amount of rest.
<i>Amanita pantherina?</i> Consumed cooked "puffballs" with hard little warts and white gills 2 days in row	9/4/09 CO	F Adult	<1	Felt funny right away and vomited 2 days in row, chills, slept most of a day – symptoms not like <i>A. pantherina</i> toxins so concluded this was the flu
<i>Amanita pantherina!</i> No details avail.	4/18/09 OR	M 50, F 48	?	News report says both hospitalized
<i>Amanita pantherina</i> mother tasted raw then cooked and served to all	6/23/09 CO	F 30s?, F 13, M 11	1.5	Coma (1), nausea (3), hallucinations (3), seizures (1) mostly better next day
<i>Amanita pantherina</i> Consumed one cooked	7/13/09 CO	M Adult	?	Pleasant visions, then coma-like state
<i>Cantharellus lateritius</i> Cook three separate times. Husband not affected ever Wife increasingly affected	11/27/09 NC	F Adult	2 day, 2 hr,, 2hr	First diarrhea for 2 days starting after 2 days. Second sick in 2 hours, vomit 1x. Third time white as ghost, vomited 5x.
<i>Chlorophyllum molybdites</i> <i>molybdites?</i> or <i>Agaricus?</i>	5/26/09 CO	M 16	4.5	Vomit, diarrhea from cooked mushrooms found in KS
<i>Chlorophyllum molybdites</i> 1 large cooked. ID by patient was <i>C rachodes</i>	6/18/09 NB	M 31	1.5	Flush, fever, dizzy, cramps, sweat, bloody vomit & diarrhea. Dizzy, headache for 24 hr
<i>Chlorophyllum molybdites</i> Cooked, unknown amount	7/30/09 CO	6M 14-80	1.5 to 7	Nausea, severe vomit, diarrhea, 80 yr M had A-fib
<i>Chlorophyllum molybdites</i> Raw for recreation	7/9/09 TX	2F 15, 15	4	Diarrhea, cramps, vomiting, nausea
<i>Chlorophyllum molybdites</i> Thumbnail size piece raw	7/10/09 HI	M Adult	3	Severe vomiting (7x), urine pinkish

<i>Chlorophyllum molybdites</i> One, raw	7/22/09 HI	M 61	1	Upset stomach, 1 hr later vomiting, diarrhea lasting > 8hr
<i>Chlorophyllum molybdites</i> Consumed ± 1 mushroom	8/19/08 MI	M 3	?	Nausea, abdominal pain, vomit, hyperglycemia, electrolytes off
<i>Chlorophyllum molybdites</i> No Details	7/2009 TN	F Adult	?	Vomiting and Diarrhea
<i>Chlorophyllum molybdites</i> Three small pieces raw	9/7/09 PA	M 28	2-3	Chills, diarrhea, cramps, vomit, diarrhea for 6 hr. Gatorade ²
<i>Chlorophyllum molybdites</i> One raw. Lost 10 pounds, given 1.5 gal IV saline	8/5/09 KY	F 19	1.5	Flushing, diarrhea, saliv., dizzy, cramps, sweating, disoriented, GI burning, blood in vomit
<i>Chlorophyllum molybdites</i> 2 cook. ID as <i>A silvaticus</i>	8/3/09 MD	M 64	3	Diarrhea, vomit for 3 hrs. 2 glasses Gatorade (electrolytes)
<i>Conocybe cf cyanopus!</i> M consumed 4-5 from yard. F amount unknown.	5/23/09 CO	M,F 5,4	soon	Acting strange, giggling, laugh, pupils dilated. Friend 4 also dilated pupils no other symptom
<i>Gymnopus cf villosipes</i> 4 mushrooms raw.	10/7/08 WA	M 18	0.3	Diarrhea (1 week), cramps, sweat!!, disorient, nausea, dry mouth joint pains, tachycardia
<i>Leccinum & Boletus edulis</i> 1 ea cooked. Elderly F & younger M no symptoms	7/14/09 NH	M 90 F U	3 (F) ~4(M)	F: Severe vomit, dizzy. M: GI symptoms, malaise, low blood count, no clotting factors, bleeding on brain. DIED
<i>Laetiporus sulphureus</i> Cooked, ~ 1oz/person	9/6/09 WI	M + 3 U	0.25	Vomiting every 10-15 minutes for 6 hrs. Alcohol involved
<i>Laetiporus ssp semialbinus</i>	August 09?	F Adult	?	Causes mild drowsiness
<i>Leucopaxillus cf albissimus??</i>	11/13/09 HI	M Adult	1	Diarrhea, vomit
Morels + alcohol	May 09 MI	? ?	?	Sick from morels. Blood alcohol 0.4
Morels undercooked	May 09 CA	M,F Adult	2	2 felt off, mildly disoriented, 1 vertigo 2 nd day, low heart, etc
Morels Consumed 13 well-cooked and beers	5/20/09 MI	M Adult	2.5	Vomit 3X, diarrhea, dizzy. Wife ate 2 and not ill
Morels Consumed 2 medium, raw	5/17/09 MT	F 52	1	Not feeling well
Morels frozen, later thawed, raw + cooked	8/8/09 ID	M 51	1-2	Nausea, vomit, diarrhea
<i>Pleurotus ostreatus</i> group Panful cooked 1 st time, handful cooked 2 nd time	5/11/09 CA	M Adult	2	Cramps, nausea, etc for several hrs. 2 nd time much worse. Previously ate with no problem
<i>Russula brevipes</i> 1 med. cap and stipe cooked	8/27/09 NJ	M 38	6	Nausea and vomiting. Note: <i>R. brevipes</i> is a species complex

<i>Suillus sp</i> Symptoms from just handling it	12/16/09 CA	F Adult	0.25	Itching, then burning then black skin for 2 weeks where touched
<i>Tricholoma?</i> + Porcini? + Chanterelles cooked	8/2/09 MT	M,F + F 3	1	All vomited. Mixed species, father a chef
Unknown. Cooked pre-sliced purchased fungi	1/31/09 CA	F 22	1	Dizzy, cramps, spasms, nausea, GI pain 5 days
Unknown. Consumed one mushroom, unknown prep	5/18/09 MT	M 29	1	Vomiting, diarrhea plus unspecified symptoms
Unknown <i>Agaricus?</i> One dried out yard mushroom	9/29/09 NV	M 17	0.3	Feeling odd, bit dizzy, vision slightly blurred

¹species! = examined by expert; ?genus = genus is a best guess; species? = species is a best guess; cf = conforms to ID but could be a close look-alike; no symbol = reliable ID from a good photo, etc but no known microscopy; M = male; F = female

²bradycardia= slow heart rate; tachycardia = racing heart; A-fib = atrial fibrillation; Gatorade - developed for athletes to replenish electrolytes and can be used to replenish electrolytes after vomiting.

Table V
Mushroom Poisoning in Animals

Mushroom species	When/Where	ID ¹ /Animal	Sex/Age	Onset (hrs)	Symptoms and Comments
<i>Amanita muscaria</i>	6/24/09 ON	Good/ Dog	F 13 wk	1-1.5	Vomited and later urinary incontinent, restless then anxious, pupils dilated, staggering, lethargic
<i>Amanita muscaria</i>	9-10-09 MI	Good/ Dog	? ?	? ?	Both humans and dog vomited, salivating from cooked mushrooms.
<i>Amanita muscaria</i> or <i>pantherina</i>	7/27/09 CO	Suspec t/ Dog	10 Mo	~2	Puppy seen eating mushroom, later tremors, leg weakness followed by comatose state. Mushrooms described were Chanterelles
<i>Amanita muscaria</i> or <i>pantherina</i>	7/1/09 CO	Suspec t/ Dog	2 yr	?	Dog liked to eat mushrooms in yard. One evening salivating, vomit & lethargic. Dead in AM. <i>Coprinus sp</i> found by owner unlikely cause
<i>Amanita pantherina</i> group	5/3/09 WA	Good/ Puppy	15 wk 30#	?	Puppy found nearly immobile, shaking and convulsing, salivating, mild hypothermia.
<i>Amanita phalloides</i>	Spring 09 CT	Good/ Horse	? ?	? ?	DEATH from acute liver failure after consuming one <i>A. phalloides</i>
<i>Calvatia cyathiformis</i>	10/8/09 OR	Good/ Dog	F pup	fast	Dog chomped mature puffball and ran gagging in spore cloud. After treatment acted as if high, lethargic

<i>Chlorophyllum molybdites</i>	6/28/09 CO	Good/ Dog	?	2.5	Dog on leash seized mushroom, owner removed, later drooling and diarrhea
<i>Chlorophyllum molybdites</i>	8/15/09 KS	Good/ Colt	M 3 mo	?	DIED after colic surgery – ruptured stomach, small intestines too inflamed for tube insertion to relieve gas. Bites out of sev. <i>C. molybdites</i>
<i>Inocybe sp</i>	7/27/09 IL	Genus/ Dog	?	?	DIED from a mushroom that to expert eye was an <i>Inocybe</i>
<i>Leucoagaricus naucinus</i>	10/2/09 OR	Good/ Dog	?	?	Lethargic for a couple of days
<i>Tricholoma terreum (myomyces)</i>	10/09 MI	Good/ Dog	2F 12 wk	1.5	Diarrhea, salivation, vomiting, weakness. Mushroom ID from vomitus of both puppies.
Unknown	7/1/09 CO	U/ Dog	?	?	Dog liked to eat various mushrooms while on walks. Sick with GI and other problems
Unknown <i>Amanita ??</i>	10/09 ME	U/ Dog	F 8 wk	Fast	Diarrhea, salivation, cramps, disorient, vomit, drowsy, watery eyes, shock. Low platelets, hi ALT, low albumin etc. DIED in 5 hours
Unknown	7/09 or 8/09 TN	U/ Dog	-	-	Vomiting, lethargy, liver failure. DIED? <i>Conocybe apala (lactea)</i> brought in, but presume Amatoxins
Unknown hallucinogenic + <i>A. muscaria</i>	8/25/09 WA	Mix/ Horse	?	?	Apparently pictures of the horse in an intoxicated state were posted on internet – reported to be comical
Unknown Ascomycete + <i>Gymnopus sp + Agaricus</i>	7/23/09 ?	U/ Horses (2)	?	?	Two horses died over the weekend and owner found parts of dried mushrooms in paddock. No direct evidence of ingestion.

¹U = unknown, Mix means mixture of species presented as suspects, Genus means confident the culprit was in the genus indicated but species unknown; Suspect means that the mushroom ID was inferred from the conditions and symptoms but ID not confirmed.

M = male, F = female