



The *Real* Story Behind Increased Amanita Poisonings in North America

DISPROPORTIONATELY POISONED: The probable reason that SE Asian immigrants are poisoned by consuming Amanita mushrooms in North America.

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Author's Note: No one should ever collect any wild mushrooms and eat them without being absolutely sure of the mushroom's identity. Death from eating poisonous mushrooms is a very real possibility. There is no "rule of thumb" or easy way to know if a mushroom is a safe edible based simply on color, smell, taste, where it occurs (soil, wood, etc.), other animals seen to consume it, the mushroom did/did not turn a silver spoon/coin black, etc. The only way to be certain is from precise identification. This is

*especially true for recent immigrants to North America. There is no doubt that many North American mushrooms resemble **different** mushrooms from other parts of the world. In some cases the lookalikes can be toxic. Since the 1970s, Hmong immigrants to North America seem to be victims of Amanita mushroom poisoning at a much higher rate than other ethnic groups.*

Key Words: Amanita, Amanita hemibapha, Amanita phalloides, Amanita princeps, amatoxin, Caesar Amanita, destroying angel, hêdt khai han, hêdt khai laun, hêdt lonoc, hêdt khai kaew, Hmong, Laos.

The Amanitas are likely the most infamous group of mushrooms. To even the most mycologically undereducated, all Amanitas are assumed toxic. "Better safe than sorry" is a good policy when it comes to Amanitas, as something on the order of 90% of mushroom-related deaths in Europe (where records have been kept for a long time) have been attributed to Amanita species from Section *Phalloideae*. These mushrooms produce substances that are highly toxic to mammals and collectively called amatoxins (or amanitins). In describing the incredible toxicity of amatoxins,

mycologist Nicholas P. Money wrote in his book *Mushroom* (2011)—I’m paraphrasing here—“The toxicity of one of the amatoxins called alpha-amanitin is extraordinary. Although a single mushroom cap contains a few thousandths of a gram, it is enough to kill the fittest of musicians. One gram of the [purified] toxin, the weight of a sweetener packet, would silence an entire symphony orchestra.”

For mushroom poisoning statistics in North America (where records have not been kept for nearly so long as Europe), the story is much the same. A 30-year study compiled by the North American Mycological Association (NAMA) found 16 of 17 mushroom-related deaths were due to amatoxins (Beug et al., 2006). The usual suspects of amatoxin poisoning are “death caps” (*Amanita phalloides*, a species not native to North America but now widespread along the West and

East Coasts) and “destroying angels” (*A. ocreata* and *A. bisporigera* and probably other as-yet unnamed species that look very similar). Destroying angels are white (but may yellow a bit with age), with white gills, ring, and saccate volva (the membranous cup at the base of the stem); death caps have similar features but color is typically yellowish-green and even brownish, but may be very pale to cream color (see images).

Of course, not all *Amanitas* are toxic—not by a long shot. Many species (mostly from the nontoxic Section *Caesareae*) are highly prized as safe and choice edibles in many parts of the world. To some North American mycophiles this information would come as a surprise. But to mushroom hunters in Europe and Asia, this is common knowledge. Enter any decent fresh market or roadside produce stands in Europe or Asia (and to some extent Central America and Africa)

during mushroom season and you would expect to find Caesar’s *Amanitas* among other wild-foraged mushrooms.

And here is where two worlds collide... sometimes with catastrophic results. There have been innumerable cases of immigrants coming to North America and made ill (or worse) as a result of consuming wild mushrooms that were collected because they looked like the ones routinely picked back in “the old country.” Southeast Asians seem to be reported at a disproportionately high rate in poisoning cases, with one group in particular affected: Hmong people. The Hmong are immigrants from Laos who came to the USA (mostly to Wisconsin, Minnesota, and northern California) following the long and brutal war in Vietnam, Laos, and Cambodia. That so many Southeast Asian (and especially Laotian) people have fallen victim to *Amanitas* in North America is

Beautiful but deadly: death caps (*Amanita phalloides* - page 6) and western destroying angels (*Amanita ocreata* - below) should never be confused with safe, edible mushrooms. Photos courtesy M. G. Wood.





Amanita hemibapha. Photo courtesy B. Bunyard.

due to that mushroom's resemblance to some other edible species back home (Hudler, 1998). Many internet websites and book authors have concluded that the lookalike must be the popular paddy straw mushroom, *Volvariella volvacea* (Money, 2011; Marley, 2010; Hudler, 1998; Benjamin, 1995). The paddy straw mushroom is indeed popular in Thailand and China and resembles an *Amanita* with its pronounced volva, but the pink gills of mature specimens tell you it's no *Amanita* (not that an inexperienced or hasty forager would notice). But the paddy straw mushroom is cultivated and unlikely to be found in markets in Laos where all mushrooms and many herbs, fruits, and much of the meat is collected from the wild. I had heard a report a few years back that the lookalike mushroom of Laos was actually an edible species of *Amanita*, and that although safe, was a "dead ringer" (no pun intended) for the dangerous destroying angels and death caps of North America.

In the summer of 2014 I attended an international mycological conference in Thailand and made a trip to Laos once the conference finished. I arrived in the ancient jungle city of Luang Prabang, perched on the steamy banks of the mighty Mekong River, eager for what might lie in wait amid the dripping jungle trees on the other side of the river, just a short ferry boat ride away. The clerk at the check-in desk of my hotel suggested I take a

look at the morning market first thing in the morning; if there were edible mushrooms to be found in the forest, they were certain to be for sale in the market. At dawn the next morning, I hit the sprawling market in the center of town and began asking around for mushrooms. And oh yes, everyone knew about edible "white egg" and "yellow egg" mushrooms (Caesar Amanitas). The yellow Caesar of Southeast Asia—(Lao name: *hèdt khai han*; Thai name: *hèdt khai laun*)—is known to mycologists as *Amanita hemibapha* and the white Caesar—(Lao name: *hèdt lonoc*; Thai name: *hèdt khai kaew*)—is *Amanita princeps*. I was completely thrilled as I could see with my own eyes a mushroom that no doubt Southeast Asian immigrants were seeking in North America, but confusing with our own toxic *Phalloideae* Amanitas. And you can see the resemblance in the images: a big white to cream colored mushroom, with white gills, arising from an underground "egg," a robust saccate volva, and white ring on the stem. An angelic mushroom, and thankfully not destroying angels. Yes I did eat them and they were *heavenly!*

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Amanita princeps. Photos courtesy B. Bunyard.



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