

# The Known Hallucinogenic Species of *Psilocybe* (Agaricomycetidae) in the World: Traditional Uses and Distribution

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A discussion of the known species of *Psilocybe* is presented with special attention to those possessing hallucinogenic effects. Guzmán in 2005 considered 227 species, 144 of them belonging to hallucinogenic mushrooms. It is interesting to observe that 718 names have been proposed as *Psilocybe* in the literature and that Guzmán, in 1983, accepted only 144 species in the genus, of which 91 were considered hallucinogenic. Another important observation is that more than 80 species of *Psilocybe* have been described by Guzmán from almost all continents since 1968. This latter observation shows the lack of studies in the genus in contrast with the oldest original studies by Fries in 1821 and 1836, and by Ricken in 1915.

Genera considered in *Psilocybe*, now independent are *Hypholoma*, *Galerina*, *Melanotus*, *Naucoria*, *Panaeolus*, *Pholiota*, *Psathyrella*, and *Stropharia*, among others. Modern studies in *Psilocybe* began with Singer in 1949; however, it was with the discovery of hallucinogenic mushrooms in Mexico in 1956 that the interest in the genus began. Modern studies in *Psilocybe* were also contributed by Bon and Roux in 2003, Noordeloos in 1999 and 2001, and Pegler in 1977, 1983, and 1986. Noordeloos added the genera *Hypholoma*, *Melanotus*, and *Stropharia* in *Psilocybe*, which a long time ago were considered independent from *Psilocybe*. The hallucinogenic species in *Psilocybe* were considered by Singer and Smith in 1958 in the section *Caerulescentes*, which was distinguished by the bluing feature in the basidioma.

However, Guzmán, in 1983, divided this section in 10 of all of the 18 considered in the genus, including some modifications, as well as a new section discussed by him, both in 1995 and 2004. Guzmán's classification is based on the form and structure of spores and the presence or absence of cystidia, including the bluing feature of the basidioma, and its farinaceous taste and flavor, although in some species—e.g., *P. mexicana* R. Heim and *P. semilanceata* (Fr.) P.Kumm. It is sometimes difficult to see the bluing reaction because it depends on the development of the basidioma. Moncalvo et al. (2002), in a molecular study of several Agaricales, divided *Psilocybe* into two genera: *Psilocybe* s.s. and *Pschedelia* Moncalvo et al., the latter genera including all hallucinogenic species that have psilocybin and psilocin. This means that there is, at the present, a discussion about what makes up the taxonomic point of view of the hallucinogenic species of *Psilocybe*. Certainly the fact that all of them are bluing weigh heavily in the discussion, but this feature is also present in other mushrooms, as is found in *Copelandia* and some Boletaceous fungi. In addition, psilocybin and psilocin are present in other genera such as *Copelandia*, *Gymnopilus*, and *Pluteus*.

Related to traditional uses of hallucinogenic species, in Mexico several groups of Indians still use these mushrooms in religious ceremonies. There are probably some tribes in Papua New Guinea that use *Psilocybe kumaenorum* R.Heim for religious purposes, as reported by Heim in 1967. Some primitive tribes

in North Africa probably used some unknown *Psilocybe* in traditional ceremonies, as shown by Samorini in 2001 in primitive paintings found in a cave. Unfortunately, after the discovery of hallucinogenic mushrooms in Mexico, young people started to use this drug for recreational purposes. This changed the traditional uses of hallucinogens in Mexico, and an economic purpose was found in the ceremonial uses. Also, the easy culturing of these fungi made an illegal trade of the hallucinogens possible in the US, Europe, and Japan, in spite of the fact that the hallucinogenic mushrooms were forbidden by several governments.

Species of *Psilocybe* are distributed in all the continents. However, Mexico is the country with the highest number of species, 53, while Europe has only 16 and the US and Canada, 22. In Latin America, excluding Mexico, there are around 60 species. Africa has only four species. In Asia (Japan, Nepal, Vietnam, Thailand, and Java) there are 15 species (besides five that Horak and Desjardin have under study). In Australia, New Zealand, Papua New Guinea, and New Caledonia there are 19 species. It is possible to see that the tropics and subtropics in the

world have the majority of the species, with more than 100, in comparison with temperate regions, which have around 40 species.

Furthermore, it is supposed that the origin of the hallucinogenic species of *Psilocybe* started in the Austral hemisphere in the old Gondwanian Continent. Another important observation in the distribution of the species is that the majority was found in hygrophytic or mesophytic forests, known also as subtropical cloud forests, and grew in humid mountains at 900–1400 m altitude close to the sea. In Mexico it was observed that more than 90% of the known species are in this kind of vegetation. *Psilocybe antioquesis* described from this kind of vegetation in Colombia recently was found in Mexico and in Cambodia in the same vegetation. An example of an abnormal distribution of a temperate species is *Psilocybe semilanceata*, very common in Europe, common only in the northwest of the US, unknown in Mexico, and reported one time from Chile and New Zealand.

Considering all of the above observations and more, the author is in the process of preparing the second edition of his monograph of 1983 on the genus *Psilocybe*.