

Mycophobic or Mycophilic?

A Comparative Ethnomycological Study between Amazonia and Mesoamerica

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As described by Fericgla (1994), some European cultures are considered as mycophobic while others are mycophilic. Among mycophilic populations, mushrooms act as positive, fantastic catalysts that transport humans to a mental state of well being. In Europe, the Mediterranean region is considered as mycophilic, while the Atlantic is mycophobic. Russians are the most mycophilic people, followed by the Catalonians. Nearly 300 common names of mushrooms have been recorded in Cataluña. Both Russians and Catalonians used to gather mushrooms in the forest. They eat them cooked in many different ways. In contrast, mycophobic attitudes have been described for English and German cultures. Among these people, mushrooms are underestimated as food and are even feared. In general, on the Atlantic coast of Europe mushrooms play a role of catalysts of negative emotions. They provoke nausea, anguish and irrational fears. People do not touch mushrooms and if by any circumstance they are dirtied by a mucous mushroom, they have the compulsion to wash their hands immediately.

Ethnomycology of Amerindian cultures remains understudied; some evidence, however, suggests that significant differences exist in their cultural attitudes towards mushrooms that could be described in terms of the mycophilia-mycophobia opposition. As suggested by the differences in mushroom utilization, Mesoamerican cultures as a whole could be considered mycophilic, while the Amazonians would be mycophobic. Furthermore, comparison of data on the use of fungi suggests the existence of significant differences in the cultural importance of mushrooms not only between the Amazonia and Mesoamerica, but also within the latter region. In this paper we present an overview of the utilization of mushrooms by Amerindian people and suggest that the differences observed in their importance may be a result of both cultural and ecological factors.

METHODS

This paper is based on a bibliographic review as well as on previous work conducted by the authors. A number of selected works that present a complete inventory with taxonomic, ecological, and ethnomycological data was compiled. Data from these sources were processed in such a way that allowed comparisons and appropriate statistical analyses.

RESULTS

The existing inventories indicate that the neotropical region has a high number of mushroom species. A number of ethnomycological studies show that mushrooms are culturally well recognized by Amazonian peoples as indicated by the existence of lexemes for naming mushrooms in general in at least nine indigenous languages (Table 1). Despite this, mushrooms seem not to play a significant role in subsistence among the Amazonian indigenous groups, with the exception of the Yanomami. Some scholars have even suggested that these cultures could be described as mycophobic (Góes-Neto and Bandeira 2000).

Contrastingly, Mesoamerican cultures have been described as mycophilic by a number of scholars. Mycological inventories indicate that this is a region with a highly diverse mycobiota. It is estimated that Mexico has nearly 5,000 fungi (Toledo and Ordoñez 1998). Formally, the ethnomycological studies in Mexico began in 1950s with studies by Heim (1956), Wasson and Wasson (1957) and Heim and Wasson (1958). These groundbreaking authors documented the use of psychotropic mushrooms for shamanistic and religious purposes. As suggested by the discovery of stone figures of mushrooms in different archaeological sites throughout Mexico and Guatemala, mushrooms played a highly significant role as hallucinogenics among Mesoamerican cultures of the Pre-classic and Classic periods. Although there are some references to the use of hallucinogenic mushrooms by the Mixtec, Mazatec, Chinantec, and other ethnic groups of Mexico, at present this practice is gradually disappearing.

Nevertheless, mushrooms still have an important place in Mesoamerican cultures as indicated by the accurate folk nomenclature that exists among many ethnic groups. Furthermore, mushrooms still play a significant role in subsistence in many indigenous communities of Mexico (Estrada and Mapes 1994). Most of the known fungal species are used for food, while some others are used for medicinal purposes. Nearly 200 species have been recorded as edible. They grow mostly in the temperate forests in the highlands where they are commonly gathered by local peoples (Table 2). The most appreciated species are sold in the local and regional markets.

Table 1. Lexemes that designate fungi in general in several Amerindian languages.

LANGUAGE	LEXEME
MESOAMERICA	
Purhepecha	Terekua
Otomi	Kju
Totonac	mazlat, malhat
Mazatec	tai
Nahua	Nanacatl, teotlaquilnanacatl
Huastec	cikinte
Tzotzil	canul te tik
Matlatzinca	nchhowi
Maya Quiche	ocox
Yucatec Maya (Pixoy)	kuxum
Huichol	yekua
SOUTH AMERICA	
Tukano	dichthybaki
Txucarramãe	pinhamak
Paumarí	badiadimorobuni
Tupi-guarani	urupê
Kayabi	uepó (ivepó)
Txicão	apco(n)
Karajá	do-rrô
Yanomami (Auaris, Sanama)	amo
Yanomami (Tototobi, Waiká)	amok / kuk

Source: Berkeley 1856; Barbosa - Rodrigues 1905; Brown 1972; Chacon 1988; Fidalgo and Prance 1976; Fidalgo and Pororooca 1986; Guzman 1960, 1997; Laughlin 1975; De Avila and Welden 1980; Escalante 1986; Estrada and Aroche 1987; Fidalgo 1965; Fidalgo and Hirata 1979; Levi - Strauss 1946; Mapes et al., 1981; Martin del Campo 1968; Martinez et al., 1983; Mata 1987; Mayer 1977; Montoya 1876; Montoya 1997; Prance 1972,1973, 1984; Roquette-Pinto 1917,1938; Villaseñor 1999; Wasson and Wasson 1957.

Table 2. Number of edible species of mushrooms growing in different habitats of Mexico.

HABITAT	NUMBER OF EDIBLE MUSHROOM SPECIES
Pine and Fir Forests	152
Oak Forest	88
Cloud Forest	35
Tropical Rain Forest	23

Table 3. Comparison of the number of mushrooms species utilized by Ameridian cultures.

	SPECIES PRESENT	EDIBLE	MEDICINAL	TOTAL UTILIZED
HIGHLANDS OF MESOAMERICA				
Purhepecha	164.0	73.0	5.0	78.0
Otomi	55.0	28.0	9.0	35.0
Temezontla	114.0	42.0	1.0	43.0
Maya	152.0	59.0	nd	59.0
LOWLANDS OF MESOAMERICA				
Maya and mestizo	21.0	6.0	nd	6.0
Totonac	31.0	11.0	1.0	12.0
Yucatec Maya	73.0	0.0	2.0	2.0
AMAZONIA				
Txicão	nd	3.0	0.0	3.0
Txucarramãe	nd	3.0	0.0	3.0
Yanomami	nd	21.0	0.0	21.0
Nambikwara	nd	1.0	0.0	1.0
Kayabi	nd	0.0	1.0	1.0

Sources: (Chacon 1988; Chio and Guzman 1982; Díaz - Barriga et al., 1988; Guzman 1983; Fidalgo 1965; Fidalgo and Hirata 1979; Fidalgo and Prance 1976; Fidalgo and Pororoça 1986; Estrada and Aroche 1987; Levi - Strauss 1946; Mapes et al., 1981; Mata 1987; Montoya 1997; Prance 1972, 1973, 1984; Roquette-Pinto 1917, 1938; Sommerkamp 1990; Sommerkamp and Guzman 1990). nd: no data available.

The comparison of the data available on the use of mushrooms by several indigenous groups of Mesoamerica and the Amazonia suggests significant differences in the cultural importance of mushrooms between these two regions. When these differences are assessed by means of a Mann Whitney test (Sokal and Rohlf 1995), they are found to be only slightly significant ($U=5$, $p=0.042$, $\alpha=0.05$). Major differences seem to be more related the ecological contrast between the temperate and the tropical regions (Table 3).

As can be seen from Table 3, at least three times more mushroom species are used in the highlands than in the lowlands of Mesoamerica. This difference is statistically significant according to a Mann Whitney test ($U=12$, $p=0.017$, $\alpha=0.05$). These results also suggest that Mesoamerican cultures living in the lowlands are more similar to Amazonian populations than to those of the Mesoamerican highlands because of their very low mushroom utilization ($U=5$, $p=0.451$, $\alpha=0.05$).

Table 4. Number of mushrooms species according to their functional type found in the highlands and the lowlands of Mesoamerica.

ZONE	REGION/LOCALITY	TERRESTRIAL	WOOD-DECOMPOSING	OTHERS	TOTAL
HIGHLANDS					
	Patzcuaro, Michoacán	111.0	19.0	7.0	137.0
	Acambay, Estado de México	40.0	6.0	3.0	49.0
	Temezontla, Tlaxcala	105.0	6.0	5.0	116.0
	Guatemala	86.0	50.0	6.0	142.0
	S.E. Mexico	115.0	23.0	2.0	140.0
	Rancho del Cielo, Tamaulipas	29.0	17.0	1.0	47.0
LOWLANDS					
	Papantla Totonac	2.0	24.0	4.0	30.0
	Yucatan	13.0	64.0	0.0	77.0
	Guatemala	6.0	15.0	0.0	21.0
	S.E. México	25.0	54.0	1.0	80.0
	Rancho del Cielo, Tamaulipas	2.0	29.0	0.0	31.0

As seen in Table 3, the only exceptions to the low use in the lowlands are the Yanomami. As Fidalgo and Prance (1976) reported, the Yanomami have a rich tradition of mushroom utilization as food. There, mushrooms are not used as either medicine, poison or as hallucinogenics. The differences in the cultural importance of mushrooms do not occur exclusively between different ethnic groups but also within a single culture. This is the case of the contrasting cultural importance of mushrooms between the Yucatec Maya and their relatives from the highlands of Guatemala.

Differences in the use of mushroom species in the lowlands and the highlands are in agreement with previous observations by Guzmán (1983). Guzmán suggested that "tropical Indians eat few edible fungi, or are not familiar with them, in contrast to the inhabitants of temperate regions." One possible explanation for the differences in mushroom utilization between highland and lowland cultures is one of ecology. As suggested by Guzmán-Davalos and Guzmán (1979), wood-decomposing fungi are more abundant in tropical regions, in contrast to cooler, temperate areas, where terrestrial species are abundant. Thus, as can be seen in Table 4, in localities such as the highlands of the state of Michoacán and Temezontla in Tlaxcala, Mexico, the number of terrestrial species is much higher than the number of wood-decomposing species. In contrast, in localities such as Papantla in the State of Veracruz and in the Yucatan Peninsula, the number of wood-decomposing species is more than five times higher than the number of terrestrial species.

Table 5. Significance of the differences in the proportions of terrestrial and wood decomposing mushroom species according in different regions and localities of Mesoamerica.

REGION	LOCALITIES	TERRRESTIAL	WOOD-DECOMPOSING
HIGHLANDS			
	Michoacan	5.18	-5.18
	Acambay	3.3	-3.3
	Temezontla	6.8	-6.8
	Guatemala	-0.06	0.06
	S.E. Mexico	4.8	-4.8
	Tamaulipas	-0.06	0.06
LOWLANDS			
	Papantla Totonac	-5.9	5.9
	Yucatan	-8.99	8.49
	Guatemala	-3.32	3.32
	S.E. Mexico	-5.88	5.88
	Tamaulipas	-6.59	6.59

According to a Habermann Adjusted Residuals. Values in boldface indicate significant differences.

In general, the proportion of the different functional groups of mushrooms in different localities of the lowlands and the highlands are found to be highly significant when statistically tested (Chi-Square=303.805, $p < 0.001$). Significant differences in these proportions in most of the localities were found to be highly significant (Table 5) when compared by means of a Habermann Adjusted Residuals Test (Sokal and Rohlf 1995). Only in the cases of Guatemala and Tamaulipas was the difference between highlands and lowlands not significant. This may reflect on both the incomplete inventory available for Guatemala and the particular ecological conditions of the Rancho del Cielo region of Tamaulipas.

DISCUSSION

Our results show that ethnomycological differences between highland and lowland cultures are not random. The significantly low proportion of terrestrial species may explain the low utilization of mushrooms for food in the lowlands. As pointed out by Estrada and Mapes (1994), this functional type is characterized by having a fleshy fructiferous body that results more palatable than the wood-decomposing fungi that commonly have a gristly and hard consistence.

Ethnomycological differences between the highlands and the lowlands may also be explained in cultural and historical terms. As discussed by a number of scholars, the migration of Amerindian cultures has proceeded frequently from the temperate to the tropical areas and from the highlands to the lowlands. In the case of the Maya, we suppose that when people colonized new areas in the lowlands, they could not find the same diversity of edible fungi that they previously utilized in the highlands. Instead of experimenting with new mycobiota, they probably replaced their previously known mycological resources by the high number of plant resources that are common to the tropical lowlands. This must be the case for hallucinogenics, for example. While the highland cultures used mostly mushrooms for shamanistic purposes, in the lowlands of the Amazonian a series of vascular plants are the ones used as hallucinogenics. Although the differences in the cultural importance of mushrooms between highland and lowland cultures and between Mesoamerica and the Amazonia are quite clear, it is difficult to speak of them in terms of the opposition between mycophily and mycophobia. More systematic and controlled comparisons are needed to go further in this subject.

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