

A WORLDWIDE GEOGRAPHICAL DISTRIBUTION OF THE NEUROTROPIC FUNGI, AN ANALYSIS AND DISCUSSION

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SUMMARY

The distribution of 214 species of neurotropic fungi in the world is discussed. The neurotropic fungi considered are divided in: 1) species with psilocybin's indoles, or probably with these substances, 2) species with ibotenic acid, 3) ergot fungi, and 4) species used as sacred fungi but without any reliable chemical studies. In the first group are *Psilocybe* (116 species), *Gymnopilus* (13 species), *Panaeolus* (13 species), *Copelandia* (12 species), *Hypholoma* (6 species), *Pluteus* (6 species), *Inocybe* (6 species), *Conocybe* (4 species), *Panaeolina* (4 species), *Gerronema* (2 species) and *Agrocybe*, *Galerina* and *Mycena* (each with one species), although in several species of this group, mainly in the Panaeoloideous fungi, there are no chemical studies. In the second group are *Amanita muscaria*, *A. pantherina* and *A. regalis*; in the third group is *Claviceps purpurea* and allies: 5 species of *Claviceps* and 2 of *Cordyceps*, and in the fourth group are boletes (two genera with 8 species), *Russula* (6 species), and 5 species of gasteromycetes in 3 genera. Concerning the distribution of *Psilocybe*, the majority of the species are in the Austral hemisphere, or close to this, mainly in the subtropical humid forests, where reside the most important ethnic groups that use the neurotropic fungi, as native peoples in Mexico and New Guinea. Mexico has the highest number of neurotropic species of fungi, with 76 species, of which 44 belong to *Psilocybe* (39 % of the world). More than 450 bibliographic references were considered.

INTRODUCTION

The fungi with neurotropic (hallucinogenic or psychotropic) properties, also referred to as hallucinogenic, narcotic, magic, sacred, psychedelic or entheogenic mushrooms, have a great diversity and a large world distribution. During the past 48 years since the rediscovery of the traditional use of the hallucinogenic fungi in Mexico among several groups of indigenous peoples native in the central or southern regions of the country, numerous species of neurotropic mushrooms have been identified. First they were studied by Schultes (1939), Singer (1949, 1958), Singer and Smith (1958), Heim (1956a, b, 1957a), Wasson and Wasson (1957), Heim & Wasson (1958) and Wasson (1959a, b). These fungi were so important in the traditions of Mexico, that Guzmán (1997) reported more than two hundred common names of them, many in Indian languages, as "apipiltzin", "atkad", "di nize taaya", "shi thó", and "teotlaquilnanácatl"

(that means: kid or little boy, mayor or leader, fungus of the genius, that eruptions thing, and divine fungus that describes, respectively), including the unusual and rare word "teonanácatl" (divine mushroom), first reported by Sahagún (1569-1582) and then by Schultes (1939), which is now so indiscriminately used to name any Mexican hallucinogenic fungi. Among the most common Spanish names used by the Indians when referring to the sacred mushrooms, are "san isidro", "pajaritos" and "derrumbes" (a Spanish saint of the agriculture, little birds, and landslides, respectively). These are the most common names used when describing *Psilocybe cubensis* *, *P. mexicana* and *P. zapotecorum*, respectively (Guzmán, 1959, 1963, 1997 ; Allen, 1997a). The studies on the neurotropic fungi in Mexico were so important, that Guzmán (1990a, b) divided the development of the Mexican mycology into two important periods: 1) **before** Wasson, Heim and Singer's studies on the hallucinogenic fungi, which

[quote]* For the authors, synonyms and classification of the species see Table I, except for species not considered there. developed between 1954-1958, and 2) **after** Wasson, Heim and Singer's studies. This came about because, the studies by these specialists involved in the neurotropic fungi were so significant towards the study of other fungi, that they produced interest in other specialists to study all of the fungi in the country.[/quote]

In the late fifty's, only around 20 species of the neurotropic fungi were recognized, belonging to the genera *Psilocybe* (the majority), *Conocybe* (e.g. *C. siliginoides*), *Stropharia* (e.g. *S. cubensis*, later re-identified as *Psilocybe cubensis*), *Panaeolus* (as *P. sphinctrinus*), *Cordyceps* (two species), *Claviceps* (*C. purpurea*) and *Amanita* (*A. muscaria*); also considered were the edible species of *Clavariadelphus* and *Gomphus*, which were erroneously mixed with the properties of *Cordyceps* spp. (Heim & Wasson, 1958; Singer & Smith, 1958; Guzmán, 1959). Wasson and Wasson (1957) brought attention to the fact that *Amanita muscaria* was an important sacred fungus in the Siberian region (Russia) between the Chukchee, Kamchadal and Koryak peoples, as were the psilocybian fungi important amongst the Indians in Mexico. Later, Singer (1960), Heim and Wasson (1965) and Heim (1965, 1978) reported the use of *Psilocybe*, *Russula* and Boletaceous fungi as sacred mushrooms among several groups of aborigines in New Guinea.

The criteria used to define the various neurotropic fungi are often confusing according to some of the mycologists who study them. For example, Olbridge *et al.* (1989) considered some polypores known to contain hordenine, N-methyltryamine and tyramine, as psychotropic fungi; e.g. *Laetiporus sulphureus* (Bull. : Fr.) Murrill and *Meripilus giganteus* (Pers. : Fr.) P. Karst. They produce certain chemical reactions in the central

nervous system which resulted in dizziness and disorientation. However, the first species is a common and important edible fungus in Mexico (Guzmán, 1977a, 1997) as well as in other parts of the world (Dickinson & Lucas, 1979; Metzler *et al.*, 1992), and from the latter species there are no reports concerning its use, as there are regarding other polypores. Thoen (1982) commented on the use in several regions of some polypores in religious ceremonies for magic activities, as *Polyporus tuberaster* Jacq. : Fr., *Poria cocos* (Schwein.) Wolf, *Ganoderma lucidum* (M.A. Curt. : Fr.) P. Karst., *Fomes fomentarius* (L. : Fr.) Kickx and others. Guzmán *et al.* (1975) reported the cult of *Ganoderma lobatum* (Schwein.) G.F. Atk. in a church in Mexico (in Chignahuapan, Puebla); that church was built especially in honor of the fungus. The Indians who reside in the region regard the fungus as a saint. This interesting fungus was found in the last century and is decorated in its inner surface with an arresting sketch, portraying a Christ with a sun and moon on each side of him. However, there is no evidence of neurotropic properties in this fungus, and probably its use in the cult is in relationship with the use of neurotropic species of *Psilocybe* used in the region, where they grow, as was discussed by Guzmán *et al.* (1975) (see also Ott, 1990).

Ott (1993) presented a list of 97 species of fungi containing psilocybin with many bibliographic references. These fungi belong to the genera *Agrocybe* (one species), *Conocybe* (four), *Copelandia* (six), *Galerina* (one), *Gerronema* (two), *Gymnopilus* (seven), *Hygrocybe* (one), *Inocybe* (seven), *Mycena* (one), *Panaeolina* (two), *Panaeolus* (nine), *Pluteus* (five), *Psathyrella* (two), and *Psilocybe* (forty seven). In all of them Ott presented their bibliographic references about their studies, notes, problems or contradictions, as those in *Gerronema*, *Hygrocybe* and *Inocybe*, according to the work of Gartz (1986e). In those bolets reported by Heim (1963, 1966b, 1967, 1978) as hallucinogenic in New Guinea, Ott (1993) stated that they might not have any neurotropic properties. Two other species *Phellinus igniarius* (Fr.) Quél. and *Fomes fomentarius* were observed in Alaska as narcotic fungi. In *Gymnopilus*, there is the interesting study on *G. penetrans* (Fr. : Fr.) Murrill (Dangy-Cave *et al.*, 1974), although this species is apparently independent of the neurotropic fungi.

Hatfield (1979) reported that ibotenic acid was present in *Amanita pantherina* and *A. cothurnata*, of which there have been reported intoxications by these fungi in central Europe. Adewusi *et al.* (1993) considered *Chlorophyllum molybdites* (Meyer : Fr.) Masee from Africa with some neurotropic properties, based in their experiments in weanling rats and related it with the common name in the Yoruba tribe: "a jegba ariwo-orun" (that means: eat and hear voices from heaven). However, many reports (Lincoff, 1981; Guzmán, 1977a; Portugal *et al.*, 1992; Duffy and Vergeer, 1977) concerning the poisonous properties of this fungus all

considered this species as a poisonous mushroom. But, Pegler (1977, 1983) commented that there are considerable confusions if this species is toxic or edible. Singer (1969) said: "apparently not all forms or races are poisonous", and he reported cases of poisoning in the U.S.A., Argentina, Phillipines and East Africa. However, Heim (1978) considered *Ch. molybdites* as an edible fungus in Africa. *Schizophyllum commune* has also been reported as an hallucinogenic fungus in Australia (Southcott, 1974). However, this species is a common edible fungus sold in popular markets in Guatemala and southeastern Mexico. The confusion originated, because the Mazatec Indians of Oaxaca (Mexico) often referred to this fungus as "nise" (little bird) a name also used for *Psilocybe mexicana*, but without any relationship between them in their properties (Guzmán, 1997).

Regarding the puffballs (Gasteromycetes, Lycoperdales), Burk (1983) discussed the magic and religious uses of several unidentified species of puffballs among certain tribes of North American Indians. The fungi which typically grew in circles (fairy rings) on the prairies, were referred to as "fallen stars". Guzmán (1994a, 1994b, 1997) discussed several puffballs used by the Mexican Indians in traditional medicine, some of them, as *Lycoperdon perlatum* Pers., forming fairy rings in grasslands, but none of these species have neurotropic properties, and on the contrary, they are edible. However, Heim and Wasson (1962) and Heim *et al.* (1965-1966) reported the use of *Lycoperdon mixtecorum* and *L. marginatum* (both synonyms of *Vascellum qudenii* and *Lycoperdon candidum*, respectively; about Guzmán, in Ott *et al.*, 1975) as a narcotic fungi among the Mixtec Indians of Oaxaca, Mexico. These fungi were later studied by Ott *et al.* (1975) in the same locality where Heim and Wasson first found them. Ott *et al.* (1975) observed that Heim and Wasson's fungi are edible and common in Mexico as reported by Guzmán (1977a, 1997), but in the Mixtec zone they are used in a confused way amongst some Indians for religious and/or magical proposes. Besides these two fungi, Ott *et al.* (1975) identified yet another six "sacred" species of fungi from the same locality, as *Vascellum pratense*, *V. curtisii* (Berk.) Kreisel, *V. intermedium* A.H. Sm., *Lycoperdon oblongiosporum*, *Rhizopogon* sp. and *Astraeus hygrometricus* (Pers.) Morg., reporting that the Indians used them indistinctly as a narcotic fungi, along with *Scleroderma verrucosum* Pers. which, during an experiment proved to be a poisonous fungus. Chemical analysis of these fungi (except in *S. verrucosum*) showed no psilocybin present. The conclusions of Ott *et al.* (1975) were that the Mixtec narcotic puffballs were a mixture or at least nine species of fungi containing no neurotropic properties. However, Schultes and Hofmann (1973, 1979) considered Heim and Wasson's fungi among the "narcotic fungi". In spite of the above observations these fungi are considered in the present work due to their popularity amongst certain groups of Indians and are noted in the bibliography (e.g. Schultes, 1976). Another example with the same

confusions and conclusions as above is *Dictyophora indusiata* with its three forms (Guzmán *et al.*, 1990) (see Table I) which are used as a special “narcotic” fungi for divination purposes among the Chinantec Indians in Oaxaca, Mexico (Heim and Wasson, 1958; Wasson, 1959a; Guzmán, 1997).

Recently, some chemical studies on species of neurotropic fungi show the presence of psilocybin or other indole metabolites in these fungi, yet also cause confusion in identifying indole properties in mushrooms which are not neurotropic (Becker *et al.*, 1988; Besl, 1994; Christiansen *et al.*, 1984; Gartz, 1985a, b, c, 1986a, b, d, 1987a, c, 1989a, b, c, 1991b, 1995a; Gurevich, 1993; Koike *et al.*, 1981; Kreisel and Lindequist, 1988; Semerdzieva *et al.*, 1986; Stijve, 1987; Stijve and Bonnard, 1986; Stijve *et al.*, 1985 and Takemoto *et al.*, 1964a, b, c). However, several studies must be considered doubtful because of erroneous analysis, as pointed out by Ott (1993) and Stijve (1995). Bresinsky and Besl (1990) considered those studies on the hallucinogenic principles of *Stropharia cyanea* (Bolt. ex Secr.) Tuomikoski [also known as *Psilocybe caerulea* (Kreisel) Noordeloos] and *Stropharia caerulea* Kreisel [*Psilocybe caerulea* (Kreisel) Noordeloos] (Noordeloos, 1995), *S. coronilla* (Bull. : Fr.) Quél., *Mycena pura* (Pers. : Fr.) P. Kumm. and *Amanita gemmata* (Fr.) Bertillon to be doubtful. Samorini (1989) pointed out the same with *Mycena pura*. Stijve and Kuyper (1988) did not find psilocybin in *Psathyrella candolleana* (Fr.) Maire, *Rickenella swartzii* (Fr.) Kuyper., *Gerronema fibula*, *Gymnopilus fulgens*, *G. spectabilis*, *Hygrocybe psittacina* (Fr.) P. Karst. and *H. psittacina* var. *californica* Hesler & A.H. Sm. Stijve and Meijer (1993) failed to find psilocybin and other psilocybian compounds in *Gymnopilus* spp., *Panaeolina foenicicii* and *Rickenella straminea* (Petch) Pegler.

Frequently, a single species has been reported with and without neurotropic substances according to different specialists. An example is *Panaeolina foenicicii*, a very common fungus in the prairies of many parts of the world. Mantle and Waight (1969), Ott and Guzmán (1976), Beug and Bigwood (1982), Stijve (1987) and Stijve *et al.* (1984) did not find any psilocybin or psilocin in this species, but other papers, e.g. Roberts *et al.* (1969), Ola'h (1969), Fiussello and Ceruti-Scurti (1972), Pollock (1976) and Bresinsky and Besl (1990) reported psilocybin. Allen and Merlin (1992c) discussed doubts on the psychoactive properties of this fungus. It seems that *P. foenicicii* is a toxic fungus, more so than neurotropic, as is with the majority of the *Panaeoleodeous* fungi, yet one of the authors (JWA) reports that some people make a tonic or herbal tea of this species which is known to contain tryptophan. Regarding *Conocybe siligineoides*, a species reported by Heim (1956b) and Heim and Wasson (1958) as a sacred mushroom in Mexico, no chemical studies have been made on this species, but *C. cyanopus*, *C. smithii* and *C. kuehneriana* were shown to contain psilocybin (Benedict *et al.*, 1967; Ohenoja *et al.*, 1987) (Mantle and Waight, 1969, wrote

erroneously that Benedict *et al.*, 1967, reported *C. siliginoides* contained psilocybin). It is important to observe that *C. siliginoides* was collected only one time in 1955 by Wasson in the State of Oaxaca, Mexico, and there are no more reports of this species. Guzmán after extensive field work in Mexico for several years has as yet failed to re-collect this fungus (Guzmán, 1997).

Concerning confusions in the chemical studies of the neurotropic fungi, there has been a problem with the mis-identifications of collected fungi. Unfortunately it has frequently been observed that during many of the chemical studies of the neurotropic there are no taxonomic basis, or sometimes a mixture of different species were studied and described as a single species. Guzmán, found a mixture of *Panaeolus* spp. and *Psilocybe mexicana*, together with *P. coprophila* (Bull. : Fr.) P. Kumm., all of them were identified as *P. coprophila* (in ENCB Herbarium at Mexico City), this included material used by Leslie and Repke to isolate psilocybin (Guzmán, 1983). *Psilocybe pseudobullacea* (Petch) Pegler is a not recognised as a bluing species (Guzmán, 1983, 1996) and no neurotropic properties have been found. However, Marcano *et al.* (1994) reported that they have isolated psilocybin and psilocin from Venezuelan specimens. It is probable that the Venezuelan material might possibly belong to an as yet undetermined neurotropic species. Høiland (1978) reported psilocybin in *P. atrobrunnea*. It is probable that Høiland's fungus is close to *P. coprinifacies* or *P. maire*, since *P. atrobrunnea* is not a neurotropic fungus (Guzmán, 1983).

In the chemical studies on fungi the age of the studied specimens should also be considered an important aspect. Repke *et al.* (1977) showed variations in the presence of baecocystin according to the age of the studied materials, e.g., yet in some collections specimens of *Psilocybe baecocystis* and *P. cyanescens* revealed no traces of indoles in specimens analysed 20-60 days after the collection. This explains why the Mexican Indians wisely say in relationship with the use of the sacred mushrooms, that the old dried specimens kept for more than one year, are not good to use, and they throw them out. One of the authors (Guzmán), observed in an experiment that normal doses of hallucinogenic fungi (*Psilocybe mexicana* in one case, and *P. caerulescens* in other), were only little neurotropic or none-active in the persons who ate them, because the fungi were kept dried for almost a year. Ohenoja *et al.* (1987) detected a decrease of psilocybin in herbarium specimens of *P. semilanceata*, according to the age of the collections. They did find 0.014, 0.67, and 0.84 % dry wt. in specimens from 1869, 1954 and 1976, respectively. So here we have one collection dated over 130 years-old. It seems that psilocybin and psilocin are volatiles, as Guzmán observed one time, in his explorations in Oaxaca (Mexico) looking for neurotropic fungi in 1958. He experienced vivid colored hallucinations although he had not consumed any fungi. This

occurred one night when he was trying to sleep in a small closed-door room of an Indian home, which was filled with a large collection of fresh or semi fermented neurotropic specimens comprising a mixture of *Psilocybe* spp. (*P. caerulescens*, *P. cordispora*, *P. cubensis*, *P. mexicana* and *P. zapotecorum*), that were gathered by him and his Indian friends. These mushrooms were kept in sacks and had been collected for commercial purposes. The air of the room was heavy and reeked with a strong acrid aroma of the fungi which permeated the room, causing him to experience hallucinations. He came out of the room, to breathe air, and the hallucinations stopped. In another case the age of the fungi, surely was the reason why Hofmann (in Heim and Wasson, 1958) did not find any indoles in specimens of *Cordyceps capitata* and *C. ophioglossoides*. These were gathered by Wasson in a popular market in Mexico, as sacred fungi and preserved for a long time. However, it should be mentioned that some collections are not dried or preserved in a proper method, thus causing the specimens to lose potency during their preservation. These two species of *Cordyceps* are very important to the Indians of Nevado de Toluca region in Mexico, where they are used together with *Psilocybe muliercula*, called "hombrecitos" (little men) and "mujercitas" (little women), respectively. It is important to observe that the genus *Cordyceps* is taxonomically closely related to *Claviceps purpurea*, the famous ergot that produces certain types of hallucinations (Ramsbottom, 1964; Schultes & Hofmann, 1973, 1979; Wasson *et al.*, 1978). The species of *Cordyceps* are used in Mexico in special nocturnal ceremonies, where they are eaten with *Psilocybe muliercula* or ar alone. In the middle of the room of where the ceremony is held, a specimen of *Elaphomyces* (e.g. *E. granulatus* Fr., *E. muricatus* Fr. or *E. reticulatus* Vitt.), the host of those *Cordyceps*, is placed on the alter as a "director" of the ceremony (Guzmán, 1959, 1994a, b, 1997). It is interesting to observe, that these species of *Elaphomyces* are used by the Trique Indians from Alta Mixteca (Oaxaca, Mexico) as a help in the cicatrization of the wounds or to "rejuvenecer el organismo" (rejuvenate the organism) (Trappe *et al.* 1979; Guzmán, 1994a, b).

The history of the neurotropic fungi, as suggested by Stamets (1978, 1996) can be divided into four historical periods. But presently we are now in a fifth period involving a recapitulation in the study of new species and new chemical analysis. These five periods are: 1) use of the fungi by the ancient peoples in several parts of the world, as in North America, Mesoamerica, Siberia and New Guinea, are considered among the most important; 2) uncertain or erroneous studies regarding the mis-identification of such fungi recorded at the beginning of the present century (where Schultes, 1939, stated that the neurotropic fungi in Mexico belong only to *Panaeolus campanulatus* var. *sphinctrinus*, a position later followed by Singer, 1949, who also considered *Psilocybe cubensis*, based on some unidentified materials from collections by Schultes in Mexico); 3) scientific

investigations, starting with Wasson's studies in the 1950's (who followed in part the way of Schultes; 4) utilization of the fungi as a recreational drug and a degeneration of the traditional use of these fungi, mainly in Mexico, for the use of these mushrooms as recreation; this happened in the 60's and 5) recapitulation of the knowledge, descriptions of new species and more chemical analysis. The use of hallucinogenic mushrooms as a form recreation, forced the governments of many countries, to forbid the use and commerce of these fungi. However, in U.S.A., Canadá, Europe and even in Australia, they continue using these mushrooms as recreation, but in an illegal commerce (Oldridge *et al.*, 1989; Rumack and Salzman, 1978; Southcott, 1974, and Watling and Gregory, 1987). In this way, the tropical fungus *Psilocybe cubensis* has been reported from Europe, but only from illegal cultures or dry specimens collected in tropical countries. Presently, *Psilocybe cubensis*, *Copelandia (Panaeolus) cyanescens* and the sclerotia of *Psilocybe tampanensis* are now legally cultivated and sold in Smart Shops throughout the Netherlands (primarily Amsterdam). Furthermore fresh mushrooms are also currently sold in the open in some shops in Denmark.

Besides the confusions in the taxonomy of the various species of the neurotropic fungi, a survey of the vast treasure of literature shows that the subject of their distribution is still poorly developed, although Grani (1980) and Guzmán (1973, 1983) have presented some essays on the subject. When these fungi were first rediscovered and scientifically documented (Heim, 1956a, b; Singer, 1949), the scientists who first studied them believed that they only occurred in Mexico. However, numerous species of neurotropic fungi were eventually found in the U.S.A., South America, Europe, Siberia, SW of Asia and Japan (Wasson & Wasson, 1957; Heim & Wasson, 1958; Singer & Smith, 1958; Singer, 1959; Heim, 1965, 1966, Heim & Wasson, 1965; Heim *et al.*, 1967, Allen & Merlin, 1992). Guzmán (1983) in his world monograph of the genus *Psilocybe* showed a great distribution of these fungi in all the continents, with the majority of species occurring in Latin America. Recently Guzmán, 1998, 1999; Guzmán *et al.* (1991, 1993a, b, 1994, 1997a, b, 1999) have described new species of neurotropic fungi belonging to *Psilocybe* from the U.S.A., Mexico, Colombia, Puerto Rico, Spain, Thailand and New Zealand, and Gartz *et al.* (1995) and Stamets and Gartz (1995) reported new species from South Africa and the U.S.A., respectively, confirming the broad distribution of these peculiar fungi. In this way it seems that the diversity, ecological and geographical distribution of the neurotropic fungi is so vast and complex, that the authors decided to present here, a discussion of a check-list of the known species in the world.

MATERIALS AND METHODS

The present work is an update of the knowledge of the distribution of the neurotropic fungi, and a revision of the list of neurotropic species published by Allen *et al.* (1992), where 128 species were considered, but without any discussion and geographical distribution. The concept followed on the genus *Psilocybe*, is that of Guzmán (1983, 1995); that is a modification of Singer (1986) excluding Section *Chrysocystidiatae*. Kühner and Romagnesi (1953) and Kühner (1980) concepts considered one genus and involved *Psilocybe*, *Hypholoma* and *Stropharia* (*Geophila* s. Kühner & Romagnesi, or *Psilocybe* s. Kühner is not followed. In this way, the species of *Psilocybe* s. Noordeloos (1995) are not accepted (e.g. *P. aeruginosa*, *P. albonitens*, *P. aurantiaca*, *P. capnoides*, and others).

In the geographical arrangement of the present work, the authors followed an alphabetic order of the countries beginning with North America. Sometimes, it was difficult to find the exact country of the species, so an approximation was considered. In the islands, the name of the islands were used instead of the countries the islands belonged to; that is, except with the British Islands. The bibliographical references, more than 450, in the check-list of the present paper, are based in part, on the most important works where information on the description of the species, uses, traditions or chemical studies are supplied. This includes the books or papers of Bresinsky & Besl (1990), Chilton (1978), Fericgla (1994), Furst (1962), Guzmán (1997), Heim (1978); Hobbs (1995), Mckenna (1993), Ott (1976b, 1993), Rumack and Salzman (1978), Schultes and Hofmann (1973, 1979); Wasson (1962, 1968, 1980) and Wasson & Wasson (1957), and others, who provided important general information on the subject.

RESULTS

There are more than 250 species of fungi reported as neurotropic of which the authors considered 214 species in Ascomycotina (*Claviceps* and *Cordyceps*) and Basidiomycotina (20 genera). Of these later, *Psilocybe* represents the majority of the species with a total of 116 (Table I and Figs. 1-18 and 20-39). To confirm that certain species of *Psilocybe* and other agarics are neurotropic, we followed Singer and Smith (1958), Guzmán (1983) and Singer (1986), who were the authors who considered those species with the bluing feature or with indolic substances or species which suggest that they have such substances as neurotropic. In the bluing species of *Psilocybe* there are those belonging to the sections *Aztecorum*, *Brunneocystidiatae*, *Cordisporae*, *Cubensies*, *Mexicanae*, *Semilancetae*, *Stuntzae*, *Subaeruginosae* and *Zapotecorum* (Guzmán, 1983, 1995). In this way, *P. atrobrunnea*, *P. coprophila*, *P. pseudobullacea* and others were excluded as neurotropic fungi, although they been reported as hallucinogenic, as was discussed earlier. *Psathyrella sepulchralis* Singer, A.H. Sm. & Guzmán was also excluded because it was erroneously confused with *Psilocybe*

zapotecorum (Singer *et al.*, 1958; Guzmán, 1959, 1977a) and it does not contain psilocybin (Ott and Guzmán, 1976). Another species, this time a coprophilous fungus *Panaeolus antillarum* (Fr.) Dennis [= *Psilocybe antillarum* (Fr.) Sacc., *Panaeolus solidipes* (Peck) Sacc., *P. phalnearum* (Fr.) Quél., *Anellaria sepulchralis* (Berk.) Singer] is also excluded. This fungus is often erroneously identified as a *Copelandia* spp. by those people who use the fungi as a drug. This confusion occurs because both fungi present white fruit bodies and grow together in the same cow dung. However *Panaeolus antillarum* does not turn blue and is also considered to be an edible fungus widely distributed in the tropics, although it also occurs infrequently in Europe (Bon, 1987b; Palacios and Laskibar, 1995, as *P. phalnearum*; Gerhardt, 1996).

The neurotropic fungi in the present paper are defined in four groups: 1) those fungi with indolic substances, such as psilocybin, psilocin, baeocystin and norbaeocystin, mainly the bluing species of *Psilocybe*, *Conocybe* and *Copelandia*, but also found (or probably found) in some non bluing species of *Agrocybe*, *Galerina*, *Gerronema*, *Gymnopilus*, *Inocybe*, *Mycena*, *Panaeolina*, *Panaeolus* and *Pluteus* (see Table I); 2) fungi containing ibotenic acid such as *Amanita muscaria*, *A. pantherina* and *A. regalis*; 3) those fungi with the well-known ergot alkaloids, such as *Claviceps purpurea*, *C. nigricans*, *C. paspali*, *C. rolfesii* and *C. tripsicii*, and probably two species of *Cordyceps* (see Table I); and 4) those fungi used as sacred by some tribes in the world, but without any reliable chemical studies; among these species are some bolets belonging to the genera *Boletus* (6 species), *Heimiella* (2 species), *Russula* (6 species) and gasteromycetes (5 species belonging to Lycoperdales and Phallales) (see Table I). In the Panaeoloidae fungi 29 species are considered. These include *Copelandia* with 12 species, *Panaeolina* with 4 and *Panaeolus* with 13 (Table I). Of these, *Copelandia mexicana* is considered as a good species, in spite of the fact that Gerhardt (1996) placed it as a nomen excluded. In the well known genus *Psilocybe* there are problems in the taxonomic definitions of some species. *Psilocybe coprinifacies* was considered by Guzmán (1983) to be a doubtful species because of insufficient understanding and several reported mis-identifications. However, some European authors (Herink, 1950; Pouzar, 1953; Semerdzieva & Nerud, 1973; Auert *et al.*, 1980; Wurst *et al.*, 1984; Semerdzieva *et al.*, 1986) have recognized the species in Czechoslovakia. But Sebek (1983) described *P. bohémica* Sebek based on some Czech specimens which were identified as *P. coprinifacies*. Krieglsteiner (1984, 1986) considered *P. coprinifacies* to be a synonym of *P. cyanescens* emend. Krieglsteiner. Furthermore, Krieglsteiner (1986) considered *P. bohémica*, *P. maire* and *P. serbica* to be synonyms of *P. cyanescens*.

Concerning the distribution of the neurotropic mushrooms (Fig. 19) listed in this paper, many of them have been identified as far north as Alaska

and Siberia in the Northern hemisphere and as far south as Chile, Australia, and New Zealand in the austral hemisphere and from California in the western United States of North America to China and Japan in the east of Asia and from the sea level to the high mountane regions up to 4,000 m elevation (e.g. *Psilocybe aztecorum* in high mountains of Mexico at 4000 m elevation). However, as Gartz (1996) well pointed out: "The mushrooms occur in abundance wherever mycologists abound". In the distribution of the fungi is also important to consider the speciality of the specialists. For instance, the interesting paper of Mueller and Halling (1995) on an analysis of the high biodiversity of Agaricales in Neotropical forests, did not take in consideration any species of *Psilocybe*, in spite of the fact that they are very common in the area (Guzmán *et al.*, 1994, 1997b). Moreover, there are no records of neurotropic fungi from several parts of the world, as in the south of Russia, Mongolia, Arabia and Turkey, or in many regions of Africa (Fig. 19). In regards to *Psilocybe*, it should be noted that there are no records from Korea, Malaysia [GUZMAN---- ALLEN SENT YOU SPECIMENS OF P. CUBENSIS AND OR P. SUBCUBENSIS AND COPELANDIA SP. JULY 1999 FROM ALOR SELAR, KUALA LUMPUR, MALAYSIA] (except Java and Summatra) and Hawaii, and even fewer from Alaska and Costa Rica, between others. Even in the U.S.A., mycological research is somewhat limited and scarces in several states, as Arizona, Colorado, Illinois, Maryland, Vermont, Massachusetts, New Hampshire and Pennsylvania, where there are no records of neurotropic species of *Psilocybe*. This is the reason that whenever we study materials collected from any region, we find new species (Gartz *et al.*, 1995; Guzmán, 1998a, 1999a; Guzman *et al.*, 1984, 1991, 1993a, b, 1994, 1997a, b, 1999; Stamets and Gartz, 1995).

Species which cover a broad world distribution include *Panaeolina foeniseccii* and almost all other species of *Panaeolus* (see Table I). *Panaeolina foeniseccii* is a cosmopolitan fungus, but poorly known in its true distribution. In Japan where this species is very common, it is not recorded by Imazeki and Hongo (1983, 1987) and Imazeki *et al.* (1988), and it was only reported by Hongo (1986), who also considered another two species (Hongo, 1973a, b). It is surprising to see that there is not any report of this species from Central America and The Caribbean region. *Cordyceps capitata*, *C. ophioglossoides*, *Claviceps purpurea* and allies, *Amanita* spp. and some species of *Gymnopilus* and *Inocybe* listed in Table I are confined to temperate regions. Other species are tropical or subtropical such as *Psilocybe cubensis*, *P. subcubensis* and *Copelandia* spp. (see Table I), except *C. cyanescens* which sometimes grows in disturbed zones of the temperate regions, as in the Valley of Mexico, where Mexico City stands at 2220 m altitude (observed by Guzmán, and by Lincoff, pers. comm.), or in central Europe (Heim *et al.*, 1967). In Maui, in the Hawaiian Archipelago, *C. cyanescens* grows at 3,000 alt. (Merlin & Allen, 1993). *Amanita muscaria*

grows in a mycorrhizical association with *Pinus* and *Betula* in forests of the northern hemisphere (including Mexico), and/or even in pine plantations in tropical regions as in Brazil (Homrich, 1965; Stijve, 1995), Colombia (Guzmán, unpubl. notes; Velásquez *et al.*, 1998), Africa (Tanzania) (Härkönen, 1995; Härkönen *et al.*, 1994), Australia (Cleland, 1976) or New Zealand (Hongo and Yokoyama, 1978). *Psilocybe semilanceata* is known from the temperate regions of Europe, India, Russia, Canada, U.S.A., Chile, Peru, New Zealand, Australia and Tasmania, but surprisingly it is unknown in Mexico (Guzmán, 1983). The majority of the neurotropic species of *Psilocybe* grow in subtropical, mesophytic, cloud or deciduous humid forests of Mexico, Caribbean region, the eastern United States and Central Europe (Guzmán, 1983, Guzmán *et al.*, 1997a, b). In Mexico, for instance, of the 42 neurotropic species of *Psilocybe* reported in Guzmán's monograph (1983), 34 are from the mesophytic forests, 4 from the tropical forests, and 4 from the coniferous forests, in spite of the fact, that the coniferous forests have been more mycologically worked than others (Guzmán, 1977a, 1998b).

It is important to point out that in the distribution of the neurotropic fungi there are some interesting patterns. Guzmán (1983) observed that in 85 neurotropic species of *Psilocybe*, the majority of those occurred in the austral hemisphere, e.g., 59 species in South America and Mexico, vs. 18 in the U.S.A. and Canada, and only 9 in Europe, although North America and European lands are more mycologically explored than those of the southern hemisphere. The relationships between the northern and austral hemispheres mycobiotas in the Americas were discussed by Guzmán (1973, 1983) and Guzmán *et al.* (1988). They observed that northern species such as *P. caerulipes*, are common in the deciduous forests of eastern North America, and reaches as far as northeastern Mexico (Zacualtipan, Hidalgo) through the same type of vegetation (known as mesophytic forest in Mexico). But southern species such as *P. yungensis* and *P. subyungensis* which are common in South America, also reached Mexico through the mesophytic forests. Guzmán (1975) analyzed the distribution of *Pleurotus hirtus* Fr. in South America and *P. levis* (Berk. & M.A. Curtis) Singer in North America. He found that both species grow in Mexico, the first in tropical forests and the last in mesophytic forests or temperate regions. In fact, in Mexico there is a conjugation of both northern and southern mycobiotas, as it is observed with *Psilocybe*.

In the map featured in Fig. 19, we show the worldwide distribution of the neurotropic species of *Psilocybe*. It is noted that there are more localities in the northern hemisphere than in the southern, in contrast with the high number of species in the southern hemisphere, as was discussed above, except in Mexico, the Caribbean region, Mesoamerica and Colombia, where there are a high concentration of species. South America, New

Guinea, eastern Australia and New Zealand present a high diversity in *Psilocybe*, while they have been poorly explored in comparison with those species reported from Europe. In connection with the distribution of the neurotropic fungi, it seems inexact or somewhat exaggerated the world map as represented by Stamets (1996). He filled dots in the U.S.A., Mexico, South America, the central part of Africa, the central part of Asia, and the South of Australia. Horak (1983) observed interesting relationships among certain agarics and bolets in the South Pacific hemisphere. He reported that South American and Mesoamerican species of these fungi are closely related with those of Southeastern Asia (New Guinea, Indonesia and Australia), such as species of *Cystoagaricus*, *Galerina*, *Mycena*, *Paxillus* and others. This distribution is in strong relationship with that of some species of *Psilocybe*, such as *P. samuiensis* from Thailand and *P. makarorae* from New Zealand which are both closely related to *P. mexicana* from Mexico and Guatemala (all of them belonging to Section *Mexicanae*), and with *P. aucklandii* from New Zealand which is closely related to *P. zapotecorum* from Mexico and South America; both species belonging to Section *Zapotecorum*.

Another interesting observation can be seen in the nine types of distribution which Hongo (1978b) discussed in the Japanese fungi. It is possible to observe this distribution in the neurotropic fungi throughout the world. The Hongo's types of distribution are: 1) Cosmopolitan species, 2) Northern hemisphere species, 3) Eurasian species, 4) North American and Eastern Asiatic species, 5) Far Eastern species, 6) Southeastern Asiatic species, 7) Tropical and subtropical species, 8) Arctic and alpine species, and 9) Endemic species. Examples of neurotropic fungi in the first type are *Panaeolus* spp. and *Panaeolus foeniculii*; species of the second type are *Amanita* spp., *Cordyceps* spp., *Psilocybe pelliculosa* and *P. silvatica*. Eurasian species are some of the later type, such as *Amanita muscaria*. North American and Eastern Asiatic species are not well known in the neurotropic fungi except with North and South America and Eastern Asia, where we find ties between *Psilocybe graveolens*, *P. muliercula*, *P. pintonii* and *P. zapotecorum* from America, which are very closely related to *P. argentipes* and *P. subcaerulipes* from Japan. Examples of the Far Eastern species (from the Japanese point of view) are not clear in regards to the neurotropic fungi. An example of a species growing in Southeast Asia is *Psilocybe subaeruginascens* var. *subaeruginascens* known from Japan and Java, while the var. *septentrionalis* is only known of from Japan. Tropical and subtropical species are *P. cubensis*, *P. subcubensis*, *Copelandia cyanescens* (with some exceptions), *C. tropicalis* and other species of the genus, and maybe *Gerronema fibula* that is reported from Malaysia, New Guinea, Solomon Islands and South America, but also is known from Europe (see Table II). The arctic or alpine species are represented in Mexico by *Psilocybe aztecorum* var. *aztecorum* which only grows in subalpine and alpine

habitats, of the high mountains, and it presents strong relationships with *P. baecystis* from the Northwestern North America (Oregon, Washington and British Colombia) and with *P. quebecensis* from Quebec, Canada (Guzmán, 1978b); these three species belong to Section *Aztecorum*. *Panaeolus moellerianus* and *P. olivaceus* from the Faeroe Islands are two examples of northern species. Finally endemic species are *Conocybe siliginoides*, *Hypholoma naematoliformis*, *Psilocybe muliercula*, *P. chiapanensis*, *P. laurae*, and many others, that are only known in Mexico, *P. columbiana*, *P. guatapensis*, *P. pintonii* and others from Colombia, *P. brasiliensis* and *P. paulensis* from Brazil, *P. hispanica* from Spain, *P. serbica* from Central Europe, *P. portoricensis* from Puerto Rico, etc. and those species of *Panaeolina* described by Hongo from Japan and by Natarajan and Raman from India. *Psilocybe cyanescens*, *P. fimetaria*, *P. pelliculosa*, *P. semilanceata* and *P. silvatica* are common both in North America and Europe, while, *P. stuntzii* is only known in the NW of North America, and *P. coprinifacies* and *P. serbica* only in Europe.

Referring to Africa, there are few records on *Psilocybe* because of the scarce mycological explorations, in contrast with the high biodiversity of that continent. There are only 6 or 8 known neurotropic species of *Psilocybe* in Africa. Of these, *P. cubensis* seems to grow in Kenya despite the confusing reports of Cullinan and Henry (1945), followed by Charters (1957, 1958) and Vedcourt and Trump (1969). Pegler (1977) reported only *P. aquamarina* from Kenya, a species close to *P. cubensis* (Guzmán, 1995). It is interesting to observe that *P. cubensis* is very common in Mexico, Central America and South America, growing on cow dung. But the cattle in America was introduced by the Spanish people in the XVI-XVII centuries and *P. cubensis* does not grow in Europe. It is probable, as discussed by Guzmán (1983), that this fungus was introduced to America through the slave commerce of the negros during the Spanish Colonial times. The only known neurotropic *Psilocybe* from South Africa is *P. natalensis* (Gartz *et al.*, 1995), while *P. mairei* is known of from Northern Africa (Morocco and Algeria) (Malençon & Bertault, 1979; Singer & Smith, 1958; Guzmán, 1983) and from Europe (Czechoslovakia) (Semerdzieva and Nerud, 1973; Auert *et al.*, 1980; Kubicka, 1985; Semerdzieva and Wurst, 1986; Guzmán, 1983).

It is concluded in the distribution of the neurotropic species of *Psilocybe*, that these fungi may have had their origin in the southern hemisphere, mainly in South America, based in the high diversity there, and from that region reached the northern parts (North America and Europe). Concerning the traditional use of these fungi, the main ethnic groups are located in Mexico and in New Guinea, also maybe in Africa (Samorini, comm. pers.) and perhaps these fungi were once used in Colombia, where Schultes and Bright (1979) found interesting ancient gold pectorals related with the use of these mushrooms and from where Guzmán (1983),

Guzmán *et al.* (1994), Pulido (1983) and Velásquez *et al.* (1989, 1998) reported 12 neurotropic species of *Psilocybe*. Today the country with the highest number of neurotropic species and varieties of *Psilocybe* is Mexico, with 44 taxa. In the U.S.A. and Canada only 21 taxa are reported and in Europe only 14 species of neurotropic species of *Psilocybe*.

Table I. Taxonomy and synonymy of the neurotropic species considered in the present paper *

[* Only the most important synonyms are considered.]

ASCOMYCOTINA

Clavicipitales

1. *Claviceps nigricans* Tul.
2. *C. paspali* F. Stev. & J.G. Hall (= *C. rolfesii*, see below)
3. *C. purpurea* (Fr. : Fr.) Tul. [= *C. microcephala* (Wallr.) Tul.] (see in Grasso, 1955, several taxonomic forms and other synonymy) (Fig. 2)
4. *C. rolfesii* F. Stev. & J.G. Hall (according to Farr *et al.*, 1989, this is a synonym of *C. paspali*, see above)
5. *C. tripsicii* F. Stev. & J.G. Hall
6. *Cordyceps capitata* (Holmsk. : Fr.) Link (Fig. 1)
7. *C. ophioglossoides* (Fr.) Link

BASIDIOMYCOTINA

Agaricales

Tricholomataceae

8. *Gerronema fibula* (Bull. : Fr.) Singer* [= *Omphalina fibula* (Bull. : Fr.) P. Kumm.; Quél.; *Mycena fibula* (Bull. : Fr.) Kühner; *Rickenella fibula* (Bull. : Fr.) Raithelh.; *Omphalia fibula* (Bull. : Fr.) P. Kumm.; *Hemimycena fibula* (Bull. : Fr.) Singer; *Marasmiellus fibula* (Bull. : Fr.) Singer]
9. *G. solidipes* (Fr.) Singer
10. *Mycena cyanorhiza* Quél.

Amanitaceae

11. *Amanita muscaria* (L. : Fr.) Hook. with several forms, subspecies or varieties, as *A. muscaria* ssp. *muscaria*, ssp. *americana* (Lange) Singer, ssp. *flavivolvata* Singer [= var. *flavivolvata* (Singer) Jenkins], ssp. *kamtschatica* (Langsd. : Fr.) Singer var. *alba* Peck, var. *formosa* (Pers.: Fr.) Bertillon, and var. *persicina* Jenkins (see Singer, 1986, Jenkins, 1977, 1986 and Castro, 1998) (Fig. 18) (see below var. *regalis* as *A. regalis*)
12. *A. pantherina* (DC. : Fr.) P. Kumm. with varieties, as var. *mutisquamosa* (Peck) Jenkins, var. *pantherinoides* (Murrill) Jenkins and var. *velatipes* (Atkinson) Jenkins (see Jenkins, 1977)
13. *A. regalis* (Fr.) Michael [= *A. muscaria* var. *regalis* (Fr.) Bartillon]

Plutaceae

14. *Pluteus atricapillus* (Secr.) Singer [= *P. cervinus* (Schaeffer) P. Kumm.] [Orton, 1986, discussed this synonymy and concluded that the true name is *P. cervinus* because the epithet *Agaricus atricapillus* Batsch is debatable and uncertain. Singer (1986) introduced the name *P. atricapillus* (Secr.) Singer, but as Secretan's work has been declared invalid, this interpretation is not consider any more] (Fig. 3)
15. *P. cyanopus* Quél.
16. *P. glaucus* Singer
17. *P. nigriviridis* Babos
18. *P. salicinus* (Pers. : Fr.) P. Kumm. (Fig. 20)
19. *P. villosus* (Bull.) Quél.

Coprinaceae

20. *Copelandia affinis* Horak [= *Panaeolus affinis* (Horak) Ew. Gerhardt]
21. *C. anomala* (Murrill) Singer [= *Panaeolus anomalus* (Murrill) Sacc. & Trotter; about Gerhardt, 1996, this species is a synonym of *Copelandia cyanescens*)
22. *C. bispora* (Malençon & Bertault) Singer & R.A. Weeks [= *C. papilionacea* var. *bispورا* Malençon & Bertault; *Panaeolus cyanescens* var. *bisporus* (Malençon & Bertault) G. Moreno & Esteve-Ravis.; *P. bisporus* (Malençon & Bertault) Ew. Gerhardt]
23. *C. cambodginiensis* (Ola'h & R. Heim) Singer & R.A. Weeks (= *Panaeolus cambodginiensis* Ola'h & R. Heim)
24. *C. chlorocystis* Singer & R.A. Weeks [= *Panaeolus chlorocystis* (Singer & R.W. Weeks) Ew. Gerhardt]
25. *C. cyanescens* (Berk. & Broome) Singer [= *Panaeolus cyanescens* (Berk. & Broome) Sacc.; *P. papilionaceus* sensu Bres.) (see *Copelandia westii*) (Fig. 4)
26. *C. lentisporus* (Ew. Gerhardt) Guzmán (= *Panaeolus lentisporus* Ew. Gerhardt)
27. *C. mexicana* Guzmán (about Gerhardt, 1996, this a nom. excl.)
28. *C. tirunelveliensis* Natarajan & Raman [= *Panaeolus tirunelveliensis* (Natarajan & Raman) Ew. Gerhardt]
29. *C. tropica* Natarajan & Raman (about Gerhardt, 1996, this is a nom. dubia)
30. *C. tropicalis* (Ola'h) Singer & R.A. Weeks (= *Panaeolus tropicalis* Ola'h)
31. *C. westii* (Murrill) Singer (about Gerhardt, 1996, this a synonym of *C. cyanescens*)

Panaeolina (Not Psychoactive, contains no psilocine/psilocybine).

32. *Panaeolina foeniseccii* (Pers. : Fr.) Maire [= *Panaeolus foeniseccii* (Pers.: Fr.) Kühner; *Psathyrella foeniseccii* (Pers. : Fr.) A.H. Sm.]

33. *P. rhombisperma* Hongo (about Gerhardt, 1996, this is a nom. excl.) [Horak (1980) considered this species as *Crucispora rhombisperma* (Hongo) Horak]
34. *P. sagarae* Hongo (about Gerhardt, 1996, this is a nom excl.)
35. *P. microsperma* Natarajan & Raman (= *Panaeolina indica* Sathe & J.T. Daniel; this is the true name about Gerhardt, 1996)

Panaeolus

36. *Panaeolus africanus* Ola'h
37. *P. ater* (J.E. Lange) Kühner & Romagn.) (it is related with *P. fimicola* about Gerhardt)
-
38. *P. castaneifolius* (Murrill) A.H. Sm. (= ? *P. olivaceus* F. H. Møller; *Panaeolina castaneifolia* (Murrill) Bon; *P. castaneifolia* (Murrill) Ew. Gerhardt, this latest seems the true name, see Gerhardt, 1996)
39. *P. fimicola* (Fr.) Gillet (see *P. ater*)
40. *P. microsporus* Ola'h & Cailleux
41. *P. moellerianus* Singer (= *P. subbalteatus* sensu Møller, 1945) (about Gerhardt, 1996, this is a nomen dub.)
42. *P. olivaceus* F.H. Møller (it is sometimes confused as a synonym of *P. castaneifolius*, see that)
43. *P. papilionaceus* (Fr.) Quél. var. *papilionaceus* sensu auct. non s. Ew. Gerhardt [= *P. campanulatus* (L. : Fr.) Quél.]
44. *P. retirugis* (Fr.) Quél.
45. *P. rubricaulis* Petch (= *P. campanuloides* Guzmán & K. Yokoy.)
46. *P. sphinctrinus* (Fr.) Quél. [= *Panaeolus campanulatus* var. *sphinctrinus* (Fr.) Bres.] (Fig. 13)(Not Psychoactive)
47. *P. subbalteatus* (Berk. & Broome) Sacc. (= *P. venenosus* Murrill)
48. *P. venezolanus* Guzmán (= *P. annulatus* Natarajan & Raman)

Bolbitiaceae

49. *Agrocybe farinacea* Hongo
50. *Conocybe cyanopus* (G.F. Atk.) Kühner [= *Pholiotina* "Galera" *cyanopus* G.F. Atk.; *Ph. cyanopoda* (G.F. Atk.) Singer; *Galerula cyanopus* G.F. Atk.]
51. *C. kuehneriana* Singer
52. *C. siligineoides* R. Heim
-
53. *C. smithii* Watling (= *Galerula cyanopes* Kauffman)

Strophariaceae

54. *Hypholoma gigaspora* (Natarajan & Raman) Guzmán [= *Psilocybe gigaspora* Natarajan & Raman; *Naematoloma gigaspora* (Natarajan & Raman) Guzmán]
55. *H. guzmanii* (Natarajan & Raman) Guzmán [= *Psilocybe guzmanii* Natarajan & Raman; *Naematoloma guzmanii* (Natarajan & Raman) Guzmán]

56. *H. naematoliformis* (Guzmán) Guzmán [= *Psilocybe naematoliformis* Guzmán; *Naematoloma naematoliformis* (Guzmán) Guzmán] (Fig. 8)
 57. *H. neocaledonica* (Guzmán & Hora) Guzmán [= *Psilocybe neocaledonica* Guzmán & Hora; *Naematoloma neocaledonica* (Guzmán & Hora) Guzmán]
 58. *H. popperianum* (Singer) Guzmán (= *Naematoloma popperianum* Singer)
 59. *H. rhombispora* (Guzmán) Guzmán (= *Naematoloma rhombispora* Guzmán)

Psilocybe

60. *Psilocybe acutipilea* (Speg.) Guzmán
 61. *P. angustipleurocystidiata* Guzmán (Fig. 15)
 62. *P. antioquiensis* Guzmán, Saldarriaga, Pineda, García & Velázquez
 63. *P. aquamarina* (Pegler) Guzmán (= *Stropharia aquamarina* Pegler)
 64. *P. argentipes* K. Yokoy.
 65. *P. armandii* Guzmán & S.H. Pollock (Fig. 25)
 66. *P. aucklandii* Guzmán, C.C. King & Bandala (Fig. 23)
 67. *P. australiana* Guzmán & Watling
 68. *P. aztecorum* R. Heim emend. Guzmán var. *aztecorum* (Fig. 24)
 69. *P. aztecorum* var. *bonetii* (Guzmán) Guzmán (= *P. bonetii* Guzmán)
 70. *P. azurescens* Stamets & Gartz
 71. *P. baeocystis* Singer & A.H. Sm. emend. Guzmán (Fig. 33)
 72. *P. banderiliensis* Guzmán
-
73. *P. barrerae* Cifuentes & Guzmán emend. Guzmán, 1999
 74. *P. bohémica* Sebek (= *P. coprinifacies* s. Herink, non s. Krieglsteiner) (Fig. 21)
 75. *P. brasiliensis* Guzmán (Fig. 26)
 76. *P. brunneocystidiata* Guzmán & Horak
 77. *P. caeruleoannulata* Singer ex Guzmán
 78. *P. caerulescens* Murrill var. *caerulescens* (= *P. caerulescens* var. *albida* R. Heim; *P. caerulescens* var. *mazatecorum* R. Heim; *P. mazatecorum* R. Heim; *P. caerulescens* var. *nigripes* R. Heim) (Fig. 34)
 79. *P. caerulescens* var. *ombrophila* (R. Heim) Guzmán (= *P. caerulescens* var. *mazatecorum* f. *ombrophila* R. Heim; *P. mixaeensis* R. Heim)
 80. *P. caerulipes* (Peck) Sacc. (Fig. 22)
 81. *P. carbonaria* Singer
 82. *P. chiapanensis* Guzmán
 83. *P. collybioides* Singer & A.H. Sm.
 84. *P. columbiana* Guzmán (Fig. 27)
 85. *P. coprinifacies* (Rolland) Pouzar s. auct., non s. Herink, non s. Krieglsteiner) (see discussion)
 86. *P. cordispora* R. Heim
 87. *P. cubensis* (Earle) Singer [= *Stropharia cubensis* Earle; *P. cubensis* var. *caerulescens* (Murrill) Singer & A.H. Sm.; *Stropharia subcyanescens* Rick; *S. cyanescens* Murrill; *S. caerulescens* (Pat.) Singer] (Fig. 7)

88. *P. cyanescens* Wakef. (non sensu Krieglsteiner)
 89. *P. cyanofibrillosa* Guzmán & Stamets
 90. *P. dumontii* Singer ex Guzmán
 91. *P. eucalypta* Guzmán & Watling
 92. *P. fagicola* R. Heim & Cailleux var. *fagicola*
 93. *P. fagicola* R. Heim var. *mesocystidiata* Guzmán
 94. *P. farinacea* Rick ex Guzmán [= *P. albofimbriata* (Rick) Singer]
-
95. *P. fimetaria* (P.D. Orton) Watling [= *P. caesieannulata* Singer;
Stropharia fimetaria P.D. Orton]
 96. *P. fuliginosa* (Murrill) A.H. Sm.
 97. *P. furtadoana* Guzmán
 98. *P. galindoi* Guzmán (= *P. galindii* Guzmán) (Fig. 10)
 99. *P. goniospora* (Berk. & Broome) Singer [= *P. lonchophora* (Berk.
 Broome) Horak ex Guzmán]
 100. *P. graveolens* Peck
 101. *P. guatapensis* Guzmán, Saldarriaga, Pineda, García & Velázquez
 102. *P. guilartensis* Guzmán, Tapia & Nieves-Rivera
 103. *P. heimii* Guzmán
 104. *P. heliconiae* Guzmán, Saldarriaga, Pineda, García & Velázquez
 105. *P. herrerae* Guzmán
 106. *P. hispanica* Guzmán
 107. *P. hoogshagenii* R. Heim var. *hoogshagenii* (= *P. caerulipes* var.
gastonii Singer; *P. zapotecorum* R. Heim s. Singer) (Fig. 16)
 108. *P. hoogshagenii* R. Heim var. *convexa* Guzmán (= *P. semperviva* R.
 Heim & Cailleux) (Fig. 6)
 109. *P. inconspicua* Guzmán & Horak
 110. *P. indica* Sathe & J.T. Daniel
 111. *P. isabelae* Guzmán
 112. *P. jacobsii* Guzmán
 113. *P. jaliscana* Guzmán
 114. *P. kumaenorum* R. Heim
 115. *P. laurae* Guzmán (Fig. 5)
 116. *P. lazoi* Singer [this is a doubtful neurotropic species, considered
 first by Guzmán (1983) as a synonym of *P. zapotecorum*, but Singer, 1986,
 claimed that this is a not bluing fungus independent of that of Guzmán,
 1983]
-
117. *P. liniformans* Guzmán & Bas var. *liniformans*
-
118. *P. liniformans* var. *americana* Guzmán & Stamets
 119. *P. mairei* Singer [= *Hypholoma cyanescens* Maire; *Geophila cyanescens*
 (Maire) Kühner & Romagn.; non *Psilocybe cyanescens* s. Krieglsteiner]
 120. *P. makarorae* Johnst. & Buchanan
 121. *P. mammillata* (Murrill) A.H. Sm.
 122. *P. meridensis* Guzmán (Fig. 17)
 123. *P. mexicana* R. Heim (Figs. 11 & 28)

124. *P. moseri* Guzmán
 125. *P. muliercula* Singer & A.H. Sm. (= *P. wassonii* R. Heim)
 126. *P. natalensis* Gartz, Reid, Smith & Eicker (Fig. 36)
 127. *P. natarajanii* Guzmán [= *P. aztecorum* var. *bonetii* (Guzmán) Guzmán s. Natarajan & Raman]
 128. *P. ochreatea* (Berk. & Broome) Horak ex Guzmán
 129. *P. papuana* Guzmán & Horak
 130. *P. paulensis* (Guzmán & Bononi) Guzmán (= *P. banderiliensis* var. *paulensis* Guzmán & Bononi)
 131. *P. pelliculosa* (A.H. Sm.) Singer & A.H. Sm. (Fig. 29)
 132. *P. pericystis* Singer
 133. *P. pintonii* Guzmán
 134. *P. pleurocystidiosa* Guzmán
 135. *P. plutonia* (Berk. & M.A. Curtis) Sacc. (Fig. 9)
 136. *P. portoricensis* Guzmán, Tapia & Nieves-Rivera
 137. *P. pseudoaztecorum* Natarajan & Raman (= *P. aztecorum* var. *aztecorum* sensu Natarajan & Raman; "*P. subaztecorum*" Guzmán, 1995)
 138. *P. puberula* Bas & Noordel.
 139. *P. quebecensis* Ola'h & R. Heim
 140. *P. ramulosa* (Guzmán & Bononi) Guzmán (= *P. zapotecorum* var. *ramulosum* Guzmán & Bononi) (Fig. 30)
-
141. *P. rostrata* (Petch) Pegler
 142. *P. rzedowskii* Guzmán
 143. *P. samuiensis* Guzmán, Bandala & Allen
 144. *P. sanctorum* Guzmán (Fig. 32)
 145. *P. schultesii* Guzmán & S.H. Pollock
 146. *P. semilanceata* (Fr. : Secr.) P. Kumm. [= *P. semilanceata* var. *caerulescens* (Cooke) Sacc.: *P. cookei* Singer; non *P. callosa* (Fr. : Fr.) Quél., which is *P. strictipes* Singer & A.H. Sm.] (Fig. 14)
 147. *P. septentrionalis* (Guzmán) Guzmán (= *P. subaeruginascens* Höhn. var. *septentrionalis* Guzmán)
 148. *P. serbica* Moser & Horak (non ss. Krieglsteiner) (Fig. 31)
 149. *P. sierrae* Singer (= *P. subfimetaria* Guzmán & A.H. Sm.)
 150. *P. silvatica* (Peck) Singer & A.H. Sm.
 151. *P. singerii* Guzmán (Fig. 35)
 152. *P. strictipes* Singer & A.H. Sm. [= *P. callosa* (Fr. : Fr.) Quél. s. Guzmán, 1983; *P. semilanceata* var. *obtusa* Bon; *P. semilanceata* var. *microspora* Singer ?]
 153. *P. stuntzii* Guzman & Ott
 154. *P. subacutipilea* Guzmán, Saldarriaga, Pineda, García & Velázquez
 155. *P. subaeruginascens* Höhn. var. *subaeruginascens* [= *P. aerugineo-maculans* (Höhn.) Singer & A.H. Sm.]
 156. *P. subaeruginosa* Cleland
 157. *P. subcaerulipes* Hongo

158. *P. subcubensis* Guzmán
 159. *P. subtropicalis* Guzmán
 160. *P. subyungensis* Guzmán
 161. *P. subzapotecorum* Guzmán
 162. *P. tampanensis* Guzmán & S.H. Pollock
 163. *P. tasmaniana* Guzmán & Watling
-
164. *P. uruguayensis* Singer ex Guzmán
 165. *P. uxpanapensis* Guzmán
 166. *P. venenata* (S. Imai) Imaz. & Hongo (= *P. fasciata* Hongo; *Stropharia caerulescens* S. Imai)
 167. *P. veraecrucis* Guzmán & Pérez-Ortiz
 168. *P. villarrealii* Guzmán
 169. *P. wassoniorum* Guzmán & S.H. Pollock
 170. *P. weilii* Guzmán, Tapia & Stamets
 171. *P. weldenii* Guzmán
 172. *P. wrightii* Guzmán
 173. *P. xalapensis* Guzmán & A. López
 174. *P. yungensis* Singer & A.H. Sm. (= *P. yungensis* var. *diconica* Singer & A.H. Sm.; *P. yungensis* var. *acutopapillata* Singer & A.H. Sm.; *P. isaurii* Singer; *P. acutissima* R. Heim)
 175. *P. zapotecorum* R. Heim emend. Guzmán (= *P. aggericola* Singer & A.H. Sm.)

Cortinariaceae

176. *Galerina steglichii* Besl
 177. *Gymnopilus aeruginosus* (Peck) Singer
 178. *G. braendlei* (Peck) Hesler
 179. *G. intermedius* (Singer) Singer
 180. *G. lateritius* (Pat.) Murrill
 181. *G. liquiritiae* (Fr.) P. Karst.
 182. *G. luteofolius* (Peck) Singer
 183. *G. luteoviridis* Thiers
 184. *G. luteus* (Peck) Hesler
 185. *G. purpuratus* (Cooke & Masee) Singer (Fig. 39)
 186. *G. sapineus* (Fr.) Maire (= *Pholiota sapinea* s. auct.)
-
187. *G. spectabilis* (Fr.) A.H. Sm. [= *G. spectabilis* (Fr.) Singer; *Pholiota spectabilis* Fr.; *Gymnopilus junonius* (Fr.) P.D. Orton; *G. spectabilis* var. *junonia* (Fr.) J.E. Lange; *Pholiota junonia* (Fr.) P. Karst.; *Ph. spectabilis* var. *junonia* (Fr.) J.E. Lange] (*G. junonius* seems to be the true name) (Fig. 12)
 188. *G. Subpurpuratus* Guzman-Davalos and Guzmán]
 189. *G. validipes* (Peck) Hesler
 190. *G. viridans* Murrill

Inocybe

191. *Inocybe aeruginascens* Babos (Fig. 37)
 192. *I. coelestium* Kuyper
 193. *I. corydalina* Quél. var. *corydalina*
 194. *I. corydalina* var. *erinaceomorpha* (Stangl & J. Veselský) Kuyper
 195. *I. haemacta* (Berk. & Cooke) Sacc. (Fig. 38)
 196. *I. tricolor* Kühner

Boletaceae

197. *Boletus flammeus* R. Heim (= *B. rufoaureus* Masee)
 198. *B. kumaeus* R. Heim
 199. *B. manicus* R. Heim
 200. *B. nigerrimus* R. Heim
 201. *B. nigroviolaceus* R. Heim (= *B. alboater* Schwein.; this name seems to be the valid epithet)
 201. *B. reayi* R. Heim
 202. *Heimiella anguiformis* R. Heim [= *Boletellus anguiformis* (R. Heim) Singer]
 203. *H. retispora* (Pat. & Baker) Boedijn

Russulaceae

204. *Russula agglutinata* R. Heim
 205. *R. kirinea* R. Heim
 206. *R. maenadum* R. Heim
 207. *R. nondorbingi* Singer

 208. *R. pseudomaendum* R. Heim
 209. *R. wahgiensis* Singer

Lycoperdales

210. *Lycoperdon candidum* Pers. (= *L. marginatum* Vittad.)
 211. *L. oblongiosporum* Berk. & M.A. Curtis
 212. *Vascellum pratense* (Pers. emend. Quél.) Kreisel
 213. *V. qudenii* (Bottomley) P. Ponce de León (= *Lycoperdon mixtecorum* R. Heim)

Phallales

214. *Dictyophora indusiata* (Vent. ex Pers.) Desv. (= *D. phalloidea* Desv.)
 (with three varieties, see Guzmán *et al.*, 1990)

TABLE II: DISTRIBUTION OF SPECIES*

[*See in Table I for the authors of each species, as well as the taxonomic position and the important synonymy. Only the most important references are quoted.]

NORTH AMERICA

ALASKA

Amanita muscaria (Chilton & Ott, 1976; Heim, 1978; Furst, 1992)
regalis (Jenkins, 1986)
Claviceps purpurea (Grasso, 1955)
Panaeolus ater (Pollock, 1976)
P. subbalteatus (Miller *et al.*, 1982)
Psilocybe cyanescens (Stamets, 1996)

CANADA**Widely distributed or no reported distribution**

Amanita muscaria (Groves *et al.*, 1958; Groves, 1962; Schultes & Hofmann, 1979; Wasson, 1979; Ammirati *et al.*, 1985; Navet, 1988; Furst, 1992; Ott, 1993)
A. pantherina (Groves *et al.*, 1958; Groves, 1962; Ott, 1993)
Claviceps purpurea (Grasso, 1955; Singer *et al.*, 1958)
Conocybe smithii (Ammirati, 1985)
Gymnopilus aeruginosus (Ammirati, 1985)
G. sapineus (Hesler, 1969)
Panaeolina foenisecii (Groves, 1962)
Panaeolus castaneifolius (Ola'h, 1969)
P. sphinctrinus (Groves, 1962)
P. subbalteatus (Singer *et al.*, 1958; Ammirati, 1985)

Psilocybe semilanceata (Heim *et al.*, 1966a; Heim, 1971; Dawson & Morelli, 1978; Douglas-Kinghorn, 1979; Samorini, 1993)

Alberta

Amanita muscaria (Ammirati *et al.*, 1985)
Conocybe kuehneriana (Schalkwijk-Barendsen, 1997)
Gymnopilus luteofolius (Schalkwijk-Barendsen, 1997)
G. sapineus (Schalkwijk-Barendsen, 1997)
G. spectabilis (Schalkwijk-Barendsen, 1997)
Panaeolus sphinctrinus (Ott, 1976b, 1993; Schalkwijk-Barendsen, 1997)
P. subbalteatus (Schalkwijk-Barendsen, 1997)

British Columbia

Amanita muscaria (Jenkins, 1977; Ammirati *et al.*, 1985)
A. pantherina (Jenkins, 1977; Ammirati *et al.*, 1985)
Conocybe cyanopus (Repke *et al.*, 1977; Stamets, 1978, 1996)
Gymnopilus luteofolius (Stamets, 1996)
Panaeolus papilionaceus (Gerhardt, 1996)
P. subbalteatus (Ammirati *et al.*, 1985)
Psilocybe baeocystis (Singer & Smith, 1958; Guzmán *et al.*, 1976; Repke *et al.*, 1977; Stamets, 1978; Guzmán, 1983)
P. cyanofibrillosa (Stamets, 1996)

- P. cyanescens* (Repke *et al.*, 1977; Stamets, 1978; Lincoff, 1981; Guzmán, 1983; Ammirati, *et al.*, 1985; Arora, 1986)
P. fimetaria (Guzmán, 1983; Stamets, 1996)
P. pelliculosa (Singer & Smith, 1958; Guzmán *et al.*, 1976; Ott, 1976b; Ott & Bigwood, 1978; Repke *et al.*, 1977; Hatfield, 1979; Lincoff, 1981; Guzmán, 1983; Ammirati *et al.*, 1985)

P. semilanceata (Heim *et al.*, 1966; Ola'h, 1967; Guzmán *et al.*, 1976; Ott, 1976b; Repke *et al.*, 1977; Stamets, 1978, 1996; Hatfield, 1979; Guzmán, 1983; Ammirati *et al.*, 1985; Arora, 1986; Redhead, 1989; Turner & Szcawinski, 1991; Furst, 1992; Schalkwijk-Barendsen, 1997)
P. sierrae (Stamets, 1996; Guzmán, 1983)
P. silvatica (Singer & Smith, 1958)
P. strictipes (Ammirati *et al.*, 1985; Guzmán *et al.*, 1976; Guzmán, 1995; Stamets, 1996)
P. stuntzii (Guzmán *et al.*, 1976; Ott, 1976b; Repke *et al.*, 1977; Ott & Bigwood, 1978; Stamets, 1978, 1996; Guzmán, 1983)

Newfoundland

Psilocybe semilanceata (Redhead, 1989)

New Brunswick

Psilocybe fimetaria (Stamets, 1996)
P. semilanceata (Redhead, 1989)

Northwest Territory

Amanita muscaria (Ammirati *et al.*, 1985)

Nova Scotia

Amanita muscaria (Ammirati *et al.*, 1985)
Gymnopilus spectabilis (Hesler, 1969)
Psilocybe semilanceata (Redhead, 1989)

Ontario

Amanita muscaria (Jenkins, 1977; Ammirati *et al.*, 1985; Navet, 1989)
Gymnopilus spectabilis (Ammirati *et al.*, 1985)
G. viridans (Hatfield *et al.*, 1978; Ammirati *et al.*, 1985)
Panaeolina foenisecii (Chilton, 1978)
Panaeolus sphinctrinus (Ammirati *et al.*, 1985)

P. subbalteatus (Pollock, 1976)
Psilocybe caerulipes (Singer & Smith, 1958)
P. silvatica (Singer & Smith, 1958; Stamets, 1978; 1996)

Prince Edward Island

Psilocybe semilanceata (Redhead, 1989)

Quebec

- Amanita muscaria* (Jenkins, 1977; Ammirati *et al.*, 1985)
Gymnopilus viridans (Ammirati *et al.*, 1985)
Panaeolina foenicisecii (Pollock, 1976; Allen & Merlin, 1992c)
Panaeolus castaneifolius (Ola'h, 1969; Pollock, 1976)
P. subbalteatus (Ola'h, 1967, 1969; Pollock, 1976)
Psilocybe caerulipes (Singer & Smith, 1958)
P. quebecensis (Ola'h & Heim, 1967; Stamets, 1978, 1996; Chilton, 1978; Guzmán, 1983)
P. semilanceata (Lincoff, 1981)

Saskatchewan

- Amanita muscaria* (Ammirati *et al.*, 1985)

Yukon Territory

- Amanita muscaria* (Ammirati *et al.*, 1985)

GREENLAND

- Panaeolus ater* Lange, 1955; Dennis, 1986)
P. papilionaceus (Lange, 1955; Gerhardt, 1996)

UNITED STATES
Widely distributed or not reported distribution

- Amanita muscaria* (Ramsbottom, 1954; Hongo, 1959; Schultes, 1976, 1990; Ott, 1976a, b, 1978, 1993; Cooke, 1977; Heim, 1978; Wasson, 1979; Miller, 1979; Schultes & Hofmann, 1979; Lincoff, 1981; Dickinson & Lucas, 1983; Ammirati *et al.*, 1985; Navet, 1988; Bresinsky & Besl, 1990; Furst, 1992; Nyberg, 1992; Fericgla, 1994; Hobbs, 1995)
A. pantherina (Hongo, 1959; Brady & Tyler, 1959; Tyler, 1961; Chilton *et al.*, 1974, northwest; Ott, 1976b, 1978, 1993; Miller, 1979; Lincoff, 1981; Ammirati *et al.*, 1985, northern states; Phillips, 1991; Samorini, 1993)
Boletus nigroviolaceus (Corner, 1972)
Claviceps paspali (Grasso, 1955; Abou-Chaar *et al.*, 1961; Mantle, 1977; Ott & Bigwood, 1978; Farr *et al.*, 1989)
C. purpurea (Ramsbottom, 1954; Grasso, 1955; Singer *et al.*, 1958; Singer, 1959; Schultes & Hofmann, 1973, 1979; Mantle, 1977; Heim, 1978; Dickinson & Lucas, 1983; Ott, 1993; Farr *et al.*, 1989)
C. rulfesii (Ott & Bigwood, 1978; Farr *et al.*, 1989)
C. tripsaci (Ott & Bigwood, 1978; Farr *et al.*, 1989)
Conocybe cyanopus (Heim, 1978; Ott, 1978; Schultes & Hofmann, 1979; Ammirati *et al.*, 1985; Singer, 1986, see page 548)
C. smithii (Ott, 1978; Lincoff, 1981, northwestern states; Ammirati *et al.*, 1985)

- Copelandia cyanescens* (Heim, 1978)
Cordyceps capitata (Miller, 1979; Lincoff, 1981; Phillips, 1991)
C. ophoglossoides (Lincoff, 1981; Phillips, 1991)
Gerronema fibula (Hongo, 1959, 1974; Singer, 1970; Lincoff, 1981; Bessette *et al.*, 1997)
Gymnopilus aeruginosus (Hongo, 1959; Ott, 1978; Ammirati *et al.*, 1985; Arora, 1986; Phillips, 1991)
-
- G. liquiritae* (Guzmán-Dávalos & Guzmán, 1995)
G. luteofolius (Arora, 1986; Bessette *et al.*, 1997)
G. luteus (Ammirati, 1985, eastern; Phillips, 1991; Bessette *et al.*, 1997)
G. sapineus (Miller, 1979; Arora, 1986; Bessette *et al.*, 1997)
G. spectabilis (Hongo, 1959; Ott, 1978, 1993; Ott & Bigwood, 1978; Miller, 1979; Lincoff, 1981; Dickinson & Lucas, 1983; Ammirati *et al.*, 1985; Arora, 1986; Bresinsky & Besl, 1990; Samorini, 1993; Bessette *et al.*, 1997)
G. validipes (Arora, 1986; Stamets, 1996; Bessette *et al.*, 1997)
Inocybe aeruginascens (Stamets, 1996)
I. corydalina (Stamets, 1996)
Panaeolina foeniseccii (Hongo, 1959; Ola'h, 1969, 1970; Robbers *et al.*, 1969; Fiusello & Ceruti-Scurti, 1972; Ott, 1976b, 1978; Stamets, 1978, 1996; Miller, 1979; Stijve *et al.*, 1984; Gartz, 1985c; Ammirati *et al.*, 1985; Arora, 1986; Ohenoja *et al.*, 1987; Bresinsky & Besl, 1990; Allen & Merlin, 1992c; Bessette *et al.*, 1997)
Panaeolus castaneifolius (Smith, 1948; Ott, 1978; Stamets, 1996)
P. fimicola (Hongo, 1959; Ott, 1978, 1969; Stamets, 1978, 1996; Stijve, 1995)
P. papilionaceus (Singer, 1958; Hongo, 1959; Stamets, 1978, 1996; Stijve, 1995; Bessette *et al.*, 1997)
P. retirugis (Hongo, 1959; Lincoff, 1981; Phillips, 1991; Bessette *et al.*, 1997)
P. sphinctrinus (Hongo, 1959; Ott, 1976b, 1978, 1969; Heim, 1978; Stamets, 1978, 1996; Ammirati *et al.*, 1985; Treu, 1996)
P. subbalteatus (Smith, 1948; Singer *et al.*, 1958; Singer, 1958, 1959, 1960a; Hongo, 1959, 1976; Ola'h, 1969; Ott, 1976b, 1978, 1993; Heim, 1978; Ott & Bigwood, 1978; Stamets, 1978, 1996; Smith & Smith-Weber, 1980; Lincoff, 1981; Arora, 1986)
Pluteus atricapillus (Miller, 1979; Lincoff, 1981; Phillips, 1991)
P. salicinus (Singer, 1956; Hongo, 1959; Ammirati *et al.*, 1985; Stamets, 1996)
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- Psilocybe baeocystis* (Ott & Bigwood, 1978; Lincoff, 1981, northwestern states; Bessette *et al.*, 1997)
P. caerulipes (Bessette *et al.*, 1997)
P. cubensis (Duffy & Vergeer, 1977; Ott & Bigwood, 1978; Hatfield, 1979 in Gulf Coast States; Saupe, 1981; Lincoff, 1981, Gulf Coast States; McKenna, 1990; Stamets, 1996, southeastern States; Miller, 1979)
P. cyanescens (Ott & Bigwood, 1978)
P. pelliculosa (Tyler, 1961, Pacific Northwest)
P. plutonia ? (Smith, 1948)

P. semilanceata (Repke & Leslie, 1977, Pacific Northwest; Dickinson & Lucas, 1983; Stijve, 1984, Pacific Northwest; Ammirati *et al.*, 1985; Phillips, 1991; Samorini, 1993; Gartz, 1996)

P. silvatica (Lincoff, 1981)

P. strictipes (Lincoff, 1981)

Alabama

Amanita muscaria (Jenkins, 1977, 1986)

A. pantherina (Jenkins, 1977, 1986)

Gymnopilus spectabilis (Hesler, 1969)

Psilocybe caerulescens var. *caerulescens* (Singer & Smith, 1958; Stamets, 1978, 1996; Guzmán, 1983)

Psilocybe cubensis (Jacobs, 1975)

Arizona

Gymnopilus sapineus (States, 1990)

G. spectabilis (States, 1990)

California

Amanita muscaria (Orr & Orr, 1968; Ott, 1976b; Duffy & Vergeer, 1977; Jenkins, 1977, 1986; Thiers, 1982; Arora, 1986)

A. pantherina (Orr & Orr, 1968; Jenkins, 1977, 1986; Duffy & Vergeer, 1977; Beutler & Vergeer, 1980; Thiers, 1982; Arora, 1986)

Copelandia cyanescens (Arora, 1986)

C. tropicalis (Stamets, 1978, 1996)

Cordyceps capitata (Arora, 1986)

Gymnopilus aeruginosus (Hesler, 1969; Hatfield *et al.*, 1978; Stamets, 1996)

G. liquiritae (Hesler, 1969)

G. luteofolius (Stamets, 1996)

G. sapineus (Hesler, 1969)

G. spectabilis (Hesler, 1969; Duffy & Vergeer, 1977; Ott, 1976b; Stamets, 1996)

Hypholoma popperiana (Singer, 1973, 1986; Stamets, 1978; Guzmán, 1999b)

Panaeolina foenisecii (Duffy & Vergeer, 1977; Allen & Merlin, 1992c)

Panaeolus fimicola (Gerhardt, 1996)

P. papilionaceus (Guzmán *et al.*, 1976; Gerhardt, 1996)

P. retirugis (Duffy & Vergeer, 1977)

Psilocybe azurescens (Stamets, 1996)

P. baeocystis (Guzmán *et al.*, 1976; Repke *et al.*, 1977; Duffy & Vergeer, 1977)

P. cyanescens (Guzmán *et al.*, 1976; Duffy & Vergeer, 1977; Repke *et al.*, 1977; Beutler & Vergeer, 1980; Lincoff, 1981; Guzmán, 1983, 1999a; Ammirati *et al.*, 1985; Arora, 1986; Johnston & Buchanan, 1995; Stamets, 1996)

P. cyanofibrillosa (Stamets, 1996)

P. maire (Duffy & Vergeer, 1977)

P. pelliculosa (Singer & Smith, 1958; Tyler, 1961; Ott, 1976b; Duffy & Vergeer, 1977; Ott & Bigwood, 1978; Stamets, 1978, 1996; Lincoff, 1981; Guzmán, 1983)

P. semilanceata (Stamets, 1978, 1996; Lincoff, 1981; Arora, 1986; Redhead, 1989; Tuner & Szczawinski, 1991)

P. stuntzii (Beutler & Vergeer, 1980; Guzmán, 1983)

Colorado

Amanita muscaria (Chilton & Ott, 1976; Jenkins, 1977, 1986)

A. pantherina (Chilton & Ott, 1976)

Conocybe cyanopus (Benedict *et al.*, 1967; Stamets, 1978, 1996)

Gymnopilus sapineus (Hesler, 1969)

Panaeolus papilionaceus (Gerhardt, 1996)

Connecticut

Amanita muscaria (Jenkins, 1977, 1986)

A. pantherina (Jenkins, 1977, 1986)

Florida

Copelandia chlorocystis (Weeks *et al.*, 1979)

C. cyanescens (Singer, 1960a; Pollock, 1976; Stamets, 1978, 1996; Schultes & Hofmann, 1979; Hafield, 1979; Douglas-Kinghorn, 1979)

C. westii (Singer, 1944; Weeks *et al.*, 1979)

Gymnopilus liquiritae (Hesler, 1969)

G. luteofolius (Hesler, 1969; Stamets, 1996)

G. sapineus (Hesler, 1969)

Panaeolus fimicola (Gerhardt, 1996)

Psilocybe caerulescens var. *caerulescens* (Singer & Smith, 1958; Jacobs, 1975)

P. cubensis (Heim, 1956a, b, 1958c; 1978; Singer & Smith, 1958; Ott, 1976b; Stamets, 1978, 1996; Douglas-Kinghorn, 1979; Guzmán, 1983; Turner & Szczawinski, 1991)

P. mammilata (Guzmán, 1983)

P. tampanensis (Guzmán & Pollock, 1978; Guzmán, 1983; Stamets, 1996)

Georgia

Amanita muscaria (Jenkins, 1986)

A. pantherina (Jenkins, 1986)

Psilocybe weilii (Stamets, 1996; Guzmán *et al.*, 1997a)

Idaho

Amanita muscaria (Jenkins, 1977, 1986)

A. pantherina (Jenkins, 1986)

Gymnopilus aeruginosus (Hesler, 1969; Hatfield *et al.*, 1978; Stamets, 1996)

G. liquiritae (Hesler, 1969)

G. luteofolius (Hesler, 1969)

G. sapineus (Hesler, 1969; Guzmán-Dávalos & Guzmán, 1995)
G. spectabilis (Hesler, 1969; Guzmán-Dávalos & Guzmán, 1995)
Psilocybe fimetaria (Guzmán, 1983; Stamets, 1996)
P. pelliculosa (Singer & Smith, 1958; Tyler, 1961; Smith, 1975; Guzmán *et al.*, 1976; Ott, 1976b; Ott & Bigwood, 1978; Guzmán, 1983)
P. silvatica (Singer & Smith, 1958; Guzmán, 1983)

Illinois

Panaeolus subbalteatus ? (Stein, 1959)
Pluteus salicinus (Saupe, 1981; Stijve & Kuyper, 1985; Stijve & Bonnarrd, 1986; Gartz, 1987c, 1996; Ohenoja *et al.*, 1987)

Indiana

Amanita muscaria (Jenkins, 1986)
A. pantherina (Jenkins, 1986)
Panaeolina foenisecii (Chilton, 1978)
Panaeolus papilionaceus (Gerhardt, 1996)

Iowa

Claviceps purpurea (Grasso, 1955)

Kentucky

Psilocybe cyanescens (Guzmán, 1999a)

Louisiana

Amanita muscaria (Jenkins, 1986)
Copelandia cyanescens (Stamets, 1996)
Psilocybe cubensis (Jacobs, 1975; Ott, 1976)

Maine

Amanita muscaria (Jenkins, 1977, 1986)
Gymnopilus liquiritiae (Hesler, 1969)
G. sapineus (Hesler, 1969)
G. spectabilis (Hesler, 1969)
Panaeolus papilionaceus (Heim, 1958b, 1978; Pollock, 1976; McKenna, 1990; Gerhardt, 1996; Gartz, 1996)
Psilocybe caerulipes (Singer & Smith, 1958; Stamets, 1978; Lincoff, 1981; Ammirati *et al.*, 1985)

Maryland

Amanita pantherina (Jenkins, 1977, 1986)
Panaeolus subbalteatus (Singer *et al.*, 1958; Repke *et al.*, 1977)

Massachusetts

Amanita muscaria (Jenkins, 1977)

Gymnopilus sapineus (Hesler, 1969)*G. spectabilis* (Hesler, 1969; Pollock, 1976; Gartz, 1996)*Panaeolina foenisecii* (Singer, 1969; Allen & Merlin, 1992c; Gerhardt, 1996)*Panaeolus papilionaceus* (Gerhardt, 1996)*P. subbalteatus* (Singer *et al.*, 1958)**Michigan***Amanita muscaria* (Jenkins, 1977, 1986)*A. pantherina* (Jenkins, 1977, 1986)*Conocybe smithii* (Benedict *et al.*, 1962; Stamets, 1978, 1996; Chilton, 1978;Lincoff, 1981; Ammirati *et al.*, 1985)*Gymnopilus aeruginosus* (Hesler, 1969; Hatfield *et al.*, 1978; Chilton, 1978; Ammirati *et al.*, 1985; Stamets, 1996)*G. liquiritae* (Hesler, 1969)*G. luteofolius* (Hesler, 1969; Stamets, 1996)*G. luteus* (Hatfield *et al.*, 1978; Ammirati *et al.*, 1985)*G. sapineus* (Hesler, 1969; Ammirati *et al.*, 1985)*G. spectabilis* (Hesler, 1969; Ammirati *et al.*, 1985)*G. validipes* (Hatfield *et al.*, 1978; Chilton, 1978)*Panaeolus subbalteatus* (Singer *et al.*, 1958; Pollock, 1976)*Pluteus salicinus* (Saupe, 1981)*Psilocybe caerulipes* (Singer & Smith, 1958; Stamets, 1978; Chilton, 1978;Lincoff, 1981; Guzmán, 1983; Ammirati *et al.*, 1985)*P. liniformans* var. *americana* (Guzmán, 1983; Stamets, 1996)*P. silvatica* (Singer & Smith, 1958; Stamets, 1978, 1996)**Mississippi***Amanita muscaria* (Jenkins, 1977, 1986)*A. pantherina* (Jenkins, 1986)*Psilocybe cubensis* (Jacobs, 1975; Guzmán, 1996)*P. tampanensis* (Guzmán, 1996; Stamets, 1996)**Missouri***Amanita pantherina* (Jenkins, 1986)*Gymnopilus sapineus* (Hesler, 1969)*Panaeolus papilionaceus* (Gerhardt, 1996)*P. subbalteatus* (Pollock, 1976)**Nebraska***Claviceps purpurea* (Abou-Chaar *et al.*, 1961)**New Hampshire***Amanita muscaria* (Locquin-Linard, 1965a)*Gymnopilus liquiritae* (Hesler, 1969)

G. sapineus (Hesler, 1969)
G. spectabilis (Hesler, 1969)

New Jersey

Amanita pantherina (Jenkins, 1977, 1986)
Psilocybe graveolens (Guzmán, 1983)

New Mexico

Gymnopilus liquiritae (Hesler, 1969)
G. luteofolius (Hesler, 1969; Stamets, 1996)
G. sapineus (States, 1990)
G. spectabilis (States, 1990; Hesler, 1969)
Panaeolus papilionaceus (Gerhardt, 1996)
Psilocybe azurescens (Stamets, 1996)

New York

Amanita muscaria (Jenkins, 1977, 1986)
A. pantherina (Gilberston, 1966; Jenkins, 1977, 1986)
Conocybe cyanopus (Benedict *et al.*, 1962; Gartz, 1996)
Gymnopilus liquiritae (Hesler, 1969)
G. luteofolius (Hesler, 1969; Stamets, 1996)
G. luteus (Hesler, 1969)
G. spectabilis (Hesler, 1969)
G. validipes (Hesler, 1969; Ammirati, 1985)
Panaeolina foenissessi (Gerhardt, 1996)
Panaeolus castanaeifolius (Ola'h, 1969)
P. fimicola (Gerhardt, 1996)
P. papilionaceus (Gerhardt, 1996; Gartz, 1996)
P. subbalteatus (Levine, 1917; Singer *et al.*, 1958; Heim, 1978)
P. retirugis (Levine, 1917)
Psilocybe caerulipes (Singer & Smith, 1958; Leung *et al.*, 1965; Benedict *et al.*, 1967, Guzmán, 1983)
P. semilanceata (Guzmán, 1983; Redhead, 1989)
P. silvatica (Singer & Smith, 1958; Stamets, 1978, 1996)

North Carolina

Amanita muscaria (Jenkins, 1977)
A. pantherina (Jenkins, 1977; 1986)
Gymnopilus aeruginosus (Hesler, 1969)
G. liquiritae (Hesler, 1969)
G. luteofolius (Hesler, 1969)
G. spectabilis (Hesler, 1969)
Psilocybe caerulipes (Singer & Smith, 1958; Leung *et al.*, 1965; Benedict *et al.*, 1967; Stamets, 1978; Smith & Smith-Weber, 1980; Lincoff, 1981; Guzmán,

1983)

Ohio

Amanita muscaria (Simons, 1971; Jenkins, 1986)

A. pantherina (Simons, 1971)

Gymnopilus aeruginosus (Hatfield *et al.*, 1978; Hesler, 1969; Stamets, 1996)

G. luteofolius (Hesler, 1969)

G. spectabilis (Walters, 1965; Hesler, 1969; Stamets, 1996; Gartz, 1996)

Panaeolina foenisecii (Simons, 1971)

Panaeolus subbalteatus (Singer *et al.*, 1958; Pollock, 1976)

Psilocybe azurescens (Stamets, 1996)

P. caerulipes (Singer & Smith, 1958; Guzmán, 1983)

Oregon

Amanita muscaria (Jenkins, 1977, 1986; Ott, 1978; Hobbs, 1995)

A. pantherina (Furst, 1992)

Conocybe cyanopus (Chilton, 1978; Stamets, 1996; Allen, 1997b)

C. smithii (Repke *et al.*, 1977; Stamets, 1996)

Gymnopilus aeruginosus (Stamets, 1996)

G. spectabilis (Hesler, 1969; Guzmán-Dávalos & Guzmán, 1995)

G. liquiritae (Hesler, 1969)

G. sapineus (Hesler, 1969)

G. luteofolius (Hesler, 1969)

G. viridans (Ammirati *et al.*, 1985)

Panaeolina foenisecii (Guzmán *et al.*, 1976)

Panaeolus castaneifolius (Ola'h, 1968; Guzmán *et al.*, 1976; Stamets, 1996)

P. sphinctrinus (Guzmán *et al.*, 1976)

P. subbalteatus (Singer, 1960; Ott & Guzmán, 1976; Guzmán *et al.*, 1976; Repke *et al.*, 1977)

Psilocybe azurescens (Stamets & Gartz, 1995; Stamets, 1996)

P. baeocystis (Singer & Smith, 1958; Guzmán *et al.*, 1976; Benedict *et al.*, 1962; Leung *et al.*, 1965; Repke *et al.*, 1977; Stamets, 1978, 1996; Chilton, 1978; Beug & Bigwood, 1981, 1982; Guzmán, 1983; Allen, 1997b)

P. cyanofibrillosa (Stamets, 1996; 1997b)

P. cyanescens (Brady & Tyler, 1962; Benedict *et al.*, 1962; Repke *et al.*, 1977; Stamets, 1978; Chilton, 1978; Lincoff, 1981; Guzmán, 1983, 1999a; Arora, 1986; Allen, 1997b)

P. fimetaria (Stamets, 1996; Allen, 1997b)

P. liniformans var. *americana* (Stamets *et al.*, 1980; Guzmán, 1983; Stamets, 1996)

P. pelliculosa (Singer & Smith, 1958; Tyler, 1961; Smith, 1975; Guzmán *et al.*, 1976; Ott, 1976b; Repke *et al.*, 1977; Chilton, 1978; Ott & Bigwood, 1978; Hatfield, 1979; Lincoff, 1981; Beug & Bigwood, 1982; Guzmán, 1983)

P. semilanceata (Hofmann *et al.*, 1963; Guzmán *et al.*, 1976; Ott, 1976b; Repke & Leslie, 1977; Repke *et al.*, 1977; Ott & Bigwood, 1978; Stamets, 1978; Hatfield, 1979; Douglas-Kinghorn, 1979; Christiansen *et al.*, 1981; Christiansen & Rasmussen, 1982; Guzmán, 1983; Stijve & Kuyper, 1985; Gartz, 1986c, 1989, 1991; Semerdzieva *et al.*, 1986; Turner & Szczawinski, 1991; Furst, 1992; Stamets, 1996; Allen, 1997b)

P. sierrae (Guzmán, 1983; Stamets, 1996)

P. silvatica (Singer & Smith, 1958; Repke *et al.*, 1977; Guzmán, 1983)

P. strictipes (Singer & Smith, 1958; Chilton, 1978; Stamets, 1978, 1996;

Guzmán, 1983, 1995; Ammirati *et al.*, 1985; Allen 1997b)

P. stuntzii (Guzmán & Ott, 1976; Repke *et al.*, 1977; Ott & Bigwood, 1978;

Chilton, 1978; Stamets, 1978, 1996; Beug & Bigwood, 1981, 1982; Lincoff, 1981; Guzmán, 1983; Furst, 1992; Allen, 1997b)

Pennsylvania

Amanita muscaria (Jenkins, 1977, 1986)

A. pantherina (Jenkins, 1977, 1986)

Gymnopilus aeruginosus (Stamets, 1996)

South Carolina

Amanita pantherina (Jenkins, 1986)

Tennessee

Amanita muscaria (Jenkins, 1977, 1986)

A. pantherina (Jenkins, 1977, 1986)

Gymnopilus aeruginosus (Hesler, 1969; Metzler *et al.*, 1992; Stamets, 1996)

G. liquiritae (Ammirati *et al.*, 1985)

G. luteofolius (Hesler, 1969; Stamets, 1996)

G. luteus (Ammirati *et al.*, 1985)

G. sapineus (Ammirati *et al.*, 1985)

G. spectabilis (Ammirati *et al.*, 1985)

Panaeolus fimicola (Gerhardt, 1996)

P. papilionaceus (Gerhardt, 1996)

Psilocybe caerulipes (Singer & Smith, 1958; Stamets, 1978; Guzmán, 1983)

Texas

Amanita muscaria (Jenkins, 1986; Metzler *et al.*, 1992)

A. pantherina (Jenkins, 1986)

Copelandia cambodginiensis (Chilton, 1978)

Gymnopilus aeruginosus (Metzler *et al.*, 1992; Stamets, 1996)

G. luteofolius (Hesler, 1969; Stamets, 1996)

G. luteoviridis (Hesler, 1969)

G. sapineus (Hesler, 1969)

G. spectabilis (Metzler *et al.*, 1992; Stamets, 1996)

Panaeolus sphinctrinus (Pollock, 1976)

P. subbalteatus (Metzler *et al.*, 1992)
Pluteus atricapillus (Metzler *et al.*, 1992)
Psilocybe cubensis (Jackson & Alexopoulos, 1976; Ott, 1976b; Repke *et al.*, 1977; Guzmán, 1983; Gatz, 1987b; 1989d; Metzler *et al.*, 1992)

Vermont

Amanita muscaria (Locquin-Linard, 1965a; Jenkins, 1986)
A. pantherina (Jenkins, 1986)
Gymnopilus spectabilis (Hesler, 1969)
G. liquiritae (Hesler, 1969)
G. sapineus (Hesler, 1969)
Psilocybe azurescens (Stamets, 1996)

Virginia

Amanita muscaria (Chilton & Ott, 1976; Jenkins, 1986)
A. pantherina (Jenkins, 1986)
Psilocybe semilanceata (Guzmán, 1983; Redhead, 1989)

Washington

Amanita muscaria (Benedict *et al.*, 1966; Chilton & Ott, 1976; Guzmán *et al.*, 1976; Ott, 1976a, 1978; Jenkins, 1977, 1986)
A. pantherina (Benedict *et al.*, 1966; Chilton *et al.*, 1974; Chilton & Ott, 1976; Jenkins, 1977, 1986; Furst, 1992)
Conocybe cyanopus (Benedict *et al.*, 1962, 1967; Miller & Tatelman, 1977; Repke *et al.*, 1977; Chilton, 1978; Stamets, 1978, 1996; Ammirati *et al.*, 1989; Gartz, 1996; Allen, 1997b)
C. smithii (Guzmán *et al.*, 1976; Repke *et al.*, 1977; Stamets, 1978, 1996)
Gymnopilus aeruginosus (Stuntz & Isaac, 1962; Hesler, 1969; Hatfield *et al.*, 1978; Stamets, 1996)
G. brandlei (Hesler, 1969)
G. luteofolius (Hesler, 1969)
G. sapineus (Hesler, 1969; Guzmán-Dávalos & Guzmán, 1995)
G. spectabilis (Hesler, 1969; Stamets, 1996)
G. viridans (Hesler, 1969; Ammirati *et al.*, 1985)
Mycena cyanorhizza (Singer *et al.*, 1958)
Panaeolus fimicola (Gerhardt, 1996)
P. papilionaceus (Gerhardt, 1996)
P. subbalteatus (Singer *et al.*, 1958; Stuntz & Isaac, 1962; Guzmán *et al.*, 1976; Ott, 1976b; Repke *et al.*, 1977; Stijve, 1995; Gartz, 1996; Allen, 1997b)
Psilocybe baeocystis (Singer & Smith, 1958; Leung *et al.*, 1965; Repke *et al.*, 1977; Chilton, 1978; Stamets, 1978, 1996; Beug & Bigwood, 1981, 1982; Guzmán, 1983; Gartz, 1996)
P. cyanofibrillosa (Stamets *et al.*, 1980; Guzmán, 1983)
P. cyanescens (Benedict *et al.*, 1962; Guzmán *et al.*, 1976; Repke *et al.*, 1977; Stamets, 1978; Chilton, 1978; Lincoff, 1981; Guzmán, 1983; Arora, 1986)

- P. fimetaria* (Benedict *et al.*, 1967; Guzmán, 1983; Stamets, 1996; Allen, 1997b)
- P. liniformans* var. *americana* (Guzmán, 1983; Stamets, 1996)
- P. pelliculosa* (Singer & Smith, 1958; Tyler, 1961; Smith, 1975; Guzmán *et al.*, 1976; Ott, 1976b; Repke *et al.*, 1977; Ott & Bigwood, 1978; Stamets, 1978, 1996; Chilton, 1978; Hatfield, 1979; Lincoff, 1981; Beug & Bigwood, 1982; Guzmán, 1983; Allen, 1997b)
- P. semilanceata* (Hofmann *et al.*, 1963; Guzmán *et al.*, 1976; Repke & Leslie, 1977; Repke *et al.*, 1977; Stamets, 1978, 1996; Hatfield, 1979; Douglas-Kinghorn, 1979; Christiansen *et al.*, 1981; Lincoff, 1981; Christiansen & Rasmussen, 1982; Guzmán, 1983; Stijve & Kuyper, 1985, 1989, 1991; Gartz, 1986c; Semerdzieva *et al.*, 1986; Turner & Szczawinski, 1991; Furst, 1992)
- P. silvatica* (Singer & Smith, 1958; Repke *et al.*, 1977; Guzmán, 1983)
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- P. strictipes* (Stamets, 1978, 1996; Chilton, 1978; Guzmán, 1995; Allen, 1997b)
- P. stuntzii* (Guzmán *et al.*, 1976; Guzmán & Ott, 1976; Ott, 1976b; Repke *et al.*, 1977; Chilton, 1978; Ott & Bigwood, 1978; Stamets, 1978, 1996; Lincoff, 1981; Beug & Bigwood, 1981, 1982; Guzmán, 1983; Furst, 1992; Gartz, 1996; Allen, 1997b)

West Virginia

- Amanita muscaria* (Tulloss *et al.*, 1955)
- A. pantherina* (Tulloss *et al.*, 1955)

Wisconsin

- Psilocybe azurescens* (Stamets, 1996)

Wyoming

- Gymnopilus sapineus* (Hesler, 1969)
- G. liquiritae* (Hesler, 1969)
- G. spectabilis* (Hesler, 1969)

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- Amanita muscaria* (Guzmán, 1959, 1977a, 1997; Locquin-Linard, 1965a; Lowy, 1972, 1974; Ott, 1976b, 1993; Cooke, 1977; Jenkins, 1977; Heim, 1978; Schultes & Hofmann, 1979; Welden & Guzmán, 1978; Navet, 1980; Wasson *et al.*, 1986; Herrera & Ulloa, 1990; Furst, 1992; Nyberg, 1992; Wasson, 1995)
- A. pantherina* (Guzmán, 1977a, 1997; Welden & Guzmán, 1978; Guzmán *et al.*, 1988; Guzmán *et al.*, 1988; Ott, 1993)
- Claviceps paspali* (Grasso, 1955; Herrera & Ulloa, 1990; Guzmán, 1997)
- C. purpurea* (Herrera & Ulloa, 1990; Guzmán, 1997)
- Conocybe siligineoides* [Wasson, 1957, see Wasson & Wasson, 1957; Heim, 1957a, 1958b, 1978; Heim & Wasson, 1958; Heim & Hofmann, 1958;

Benedict *et al.*, 1967; Guzmán, 1975b, 1997; Schultes, 1976; Ott & Bigwood, 1978; Schultes & Hofmann, 1979; Riedlinger, 1990 (color plate); Gartz, 1996]

Copelandia cyanescens (Singer *et al.*, 1958; Singer, 1959, 1960a; Guzmán, 1959, 1975b, 1977a, 1997; Guzmán & Pérez-Patracá, 1972; Pollock, 1976; Heim, 1978; Schultes & Hofmann, 1979; Gerhardt, 1996; Stamets, 1996)
C. mexicana (Guzmán, 1978a; Guzmán *et al.*, 1988; Gerhardt, 1996)
C. tropicalis (Guzmán & Pérez-Patracá, 1972; Pollock, 1976; Schultes & Hofmann, 1979; Guzmán *et al.*, 1988)
Cordyceps capitata (Heim, 1957d; Heim & Wasson, 1958; Guzmán, 1959, 1977a, 1997; Singer, 1959, 1958; Schultes & Hofmann, 1973, 1979; Lincoff, 1981; Heim, 1978; Herrera & Ulloa, 1990; Ott, 1993)
C. ophioglossoides (Heim & Wasson, 1958; Guzmán, 1959, 1977a, 1997; Schultes & Hofmann, 1973, 1979; Heim, 1978)
Dictyophora indusiata (Heim & Wasson, 1958; Guzmán, 1977a, 1990, 1997; Guzmán *et al.*, 1990)
Gymnopilus aeruginosus ? (Valenzuela *et al.*, 1981; Bandala *et al.*, 1988) (about Guzmán-Dávalos, 1993 and Guzmán-Dávalos and Guzmán, 1995, this species does not grow in Mexico)
G. lateritius (Guzmán-Dávalos & Guzmán, 1995)
G. liquiritiae (Guzmán-Dávalos & Guzmán, 1991, 1995)
G. sapineus (Guzmán-Dávalos & Guzmán, 1995)
G. spectabilis (Bandala *et al.*, 1988; Guzmán-Dávalos & Guzmán, 1995; Stamets, 1996)
Hypholoma naematoliformis (Guzmán, 1979, 1980, 1983, 1999b; Guzmán *et al.*, 1988)
H. rhombispora (Guzmán, 1979, 1980, 1983, 1999b; Guzmán *et al.*, 1988)
Inocybe corydalina (Bandala *et al.*, 1988)
Lycoperdon candidum (Heim & Wasson, 1958; Heim *et al.*, 1967; Schultes & Hofmann, 1973, 1979; Guzmán, 1977a, 1997; Ott *et al.*, 1975; Heim, 1978)
L. oblongiosporum (Ott *et al.*, 1975)
Panaeolina foeniseccii (Guzmán & Pérez Patracá, 1972; Guzmán, 1977a; Allen & Merlin, 1992c)(Not Psychoactive)

Panaeolus fimicola (Heim, 1956a, 1957a; Guzmán & Pérez-Patracá, 1972; Guzmán, 1990; Gerhardt, 1996)
P. papilionaceous (Herrera & Ulloa, 1990)
P. retirugis (Guzmán & Pérez-Patracá, 1972; Bandala *et al.*, 1988)
P. sphinctrinus (Schultes, 1939, 1976; Singer, 1949, 1959, 1960a, 1969; Ramsbottom, 1954; Heim, 1957a, 1958b, 1978; Singer & Smith, 1958; Singer *et al.*, 1958; Ola'h, 1969, 1970; Guzmán & Pérez-Patracá, 1972; Schultes & Hofmann, 1973, 1979; Guzmán, 1975b, 1977a, 1997, 1990a; Ott, 1976b; Ott & Bigwood, 1978; Herrera & Ulloa, 1990)

- P. subbalteatus* (Guzmán & Pérez-Patracá, 1972; Ott & Guzmán, 1976; Ott, 1976b; Guzmán, 1977a; Schultes & Hofmann, 1979; Bandala *et al.*, 1988; Herrera & Ulloa, 1990)
- P. venezolanus* (Guzmán, 1978c; Guzmán *et al.*, 1988; Gerhardt, 1996)
- Pluteus atricapillus* (Guzmán, 1975b, 1977a; Welden & Guzmán, 1978)
- Psilocybe angustipleurocystidiata* (Guzmán, 1983, 1990a, 1995, 1997; Guzmán *et al.*, 1988)
- P. armandii* (Guzmán, 1983; Guzmán *et al.*, 1988)
- P. aztecorum* var. *aztecorum* (Wasson, 1957, see note in Wasson & Wasson, 1957a, d; Heim, 1957a, 1958c; Heim & Hofmann, 1958; Heim & Wasson, 1958; Singer, 1958m 1959; Singer *et al.*, 1958; Singer & Smith, 1958; Guzmán, 1959, 1975b, 1977a, 1983, 1990a, 1997; Schultes & Hofmann, 1973; Schultes, 1976; Ott, 1976b; Ott & Bigwood, 1978; Heim, 1978; Chilton, 1978; Riedlinger, 1990, a color plate; Herrera & Ulloa, 1990)
- P. aztecorum* var. *bonetii* (Ott & Guzmán, 1976; Guzmán, 1977a, 1983, 1995, 1997; Chilton, 1978)
- P. banderillensis* (Welden & Guzmán, 1978; Guzmán, 1983; Guzmán *et al.*, 1988)
- P. barrerae* (Cifuentes & Guzmán, 1981; Guzmán *et al.*, 1988; Guzmán, 1990a, 1995, 1997; 1999a; Guzmán *et al.*, 1999)
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- P. caerulescens* var. *caerulescens* (Heim, 1957a, d, 1958b, c, 1977, 1978; Wasson, 1957, see note in Wasson & Wasson, 1957; Heim & Wasson, 1958; Heim & Hofmann, 1958; Singer & Smith, 1958; Singer, 1958, 1959; Guzmán, 1959, 1975b, 1977a, 1983, 1990a, 1997; Heim *et al.*, 1967; Schultes & Hofmann, 1973, 1979; Ott, 1976b; Schultes, 1976; Welden & Guzmán, 1978; Ott & Bigwood, 1978; Stamets, 1978, 1996; Chilton, 1978; Schultes & Hofmann, 1979; Pegler, 1983; Wasson *et al.*, 1986; Furst, 1990; Riedlinger, 1990, a color plate; Herrera & Ulloa, 1990; Lipp, 1990, 1991)
- P. caerulescens* var. *ombrophila* (Wasson, 1957, see note in Wasson & Wasson, 1957; Heim, 1957a; Heim & Wasson, 1958; Schultes & Hofmann, 1973; Heim, 1977, 1978; Ott & Bigwood, 1978; Guzmán, 1983, 1997)
- P. caerulipes* (Guzmán, 1977a, 1983; Stamets, 1996)
- P. chiapanensis* (Guzmán, 1995)
- P. cordispora* (Heim, 1957a; Heim & Wasson, 1958; Guzmán, 1959, 1977a, 1983, 1997; Schultes & Hofmann, 1973; Heim, 1978; Welden & Guzmán, 1978; Ott & Bigwood, 1978; Herrera & Ulloa, 1990; Lipp, 1990, 1991; Ott, 1993)
- P. cubensis* (Singer, 1949, 1959; Heim, 1956a, b, 1957a, 1958a, b, c, 1978; Wasson, 1957, see in Wasson & Wasson, 1957; Heim & Hofmann, 1958; Heim & Wasson, 1958; Singer, 1958; Singer & Smith, 1958; Singer *et al.*, 1958; Guzmán, 1959, 1975b, 1977a, 1983, 1990a, 1995, 1997; Chávez de la Mora, 1961; Schultes & Hofmann, 1973, 1979; Rubel & Gettelfinger-Krejci, 1976; Schultes, 1976; Ott, 1976b, 1993; Repke *et al.*, 1977; Welden & Guzmán, 1978; Chilton, 1978; Ott & Bigwood, 1978; Gartz, 1987b, 1989,

- 1996; Bauer, 1992; Stijve & Meijer, 1993; Riedlinger, 1990a, a color plate; Herrera & Ulloa, 1990; Hobbs, 1995; Stamets, 1996)
- P. fagicola* var. *fagicola* (Heim & Wasson, 1958; Schultes & Hofmann, 1973; Heim, 1978; Ott & Bigwood, 1978; Guzmán, 1983; Guzmán *et al.*, 1988)
- P. fagicola* var. *mesocystidiata* (Welden & Guzmán, 1978; Guzmán, 1983)
- P. galindoi* (Guzmán, 1983; Guzmán *et al.*, 1988)
- P. heimii* (Welden & Guzmán, 1978; Guzmán, 1983, 1997; Guzmán *et al.*, 1988)
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- P. herrerae* (Guzmán, 1983; Stamets, 1996; Guzmán *et al.*, 1988)
- P. hoogshagenii* var. *hoogshagenii* (Wasson, 1957, see note in Wasson & Wasson, 1957; Heim & Hofmann, 1958; Heim & Wasson, 1958; Schultes & Hofmann, 1973, 1979; Guzmán, 1975b, 1983, 1997; Rubel & Gelterfinger-Krejci, 1976; Schultes, 1976; Heim, 1978; Welden & Guzmán, 1978; Lipp, 1990, 1991; Stamets, 1996)
- P. hoogshagenii* var. *convexa* (Heim & Hofmann, 1958; Heim & Wasson, 1958; Heim, 1958b, c, 1978; Schultes, 1976; Chilton, 1978; Ott & Bigwood, 1978; Schultes & Hofmann, 1979; Guzmán, 1983)
- P. isabelae* Guzmán *et al.*, 1999)
- P. jacobsii* (Guzmán, 1983)
- P. jaliscana* (Guzmán, 1999a)
- P. laurae* (Guzmán, 1998a)
- P. mammilata* (Guzmán, 1983; Stamets, 1996)
- P. mexicana* (Heim, 1956a, 1957a, d, 1958b, 1978; Wasson, 1957, see Wasson & Wasson, 1957; Singer, 1958, 1959; Singer & Smith, 1958; Singer *et al.*, 1958; Heim & Hofmann, 1958; Heim & Wasson, 1958; Hofmann *et al.*, 1958; Guzmán, 1959, 1975b, 1977a, 1983, 1990a, 1997; Schultes & Hofmann, 1973, 1979; Ott, 1976b, 1993; Schultes, 1976; Cooke, 1977; Welden & Guzmán, 1978; Ott & Bigwood, 1978; Chilton, 1978; Wasson *et al.*, 1986; Furst, 1990; Hofmann, 1990; Riedlinger, 1990, a color plate; Herrera & Ulloa, 1990; Stamets, 1996; Gartz, 1996)
- P. moseri* (Guzmán, 1995)
- P. muliercula* (Wasson, 1957, see note in Wasson & Wasson, 1958; Heim, 1957a, d; Heim & Wasson, 1958; Singer, 1958, 1959; Singer *et al.*, 1958; Schultes & Hofmann, 1973, 1979; Guzmán, 1975b, 1977a, 1983, 1990a, 1997; Schultes, 1976; Ott, 1976b, 1990, 1993; Heim, 1978; Ott & Bigwood, 1978; Chilton, 1978; Brown, 1990; Demarest, 1990; Herrera & Ulloa, 1990; Stamets, 1996)
- P. pleurocystidiosa* (Guzmán, 1983; Guzmán *et al.*, 1988)
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- P. rzedowskii* (Welden & Guzmán, 1978; Guzmán, 1983; Guzmán *et al.*, 1988)
- P. sanctorum* (Guzmán, 1990a, 1995; Guzmán *et al.*, 1988)
- P. schultesii* (Guzmán, 1983; Guzmán *et al.*, 1988)
- P. singerii* (Welden & Guzmán, 1978; Guzmán, 1983; Guzmán *et al.*, 1988)

- P. subcubensis* (Guzmán, 1983, 1997; Guzmán *et al.*, 1988)
P. subtropicalis (Guzmán, 1995)
P. subyungensis (Guzmán *et al.*, 1988; Guzmán, 1995)
P. subzapotecorum (Guzmán, 1999a)
P. uxpanapensis (Welden & Guzmán, 1978; Guzmán, 1983, 1998; Guzmán *et al.*, 1988)
P. veraecrucis (Welden & Guzmán, 1978; Guzmán, 1983; Guzmán *et al.*, 1988)
P. villarrealii (Guzmán, 1998a)
P. wassoniorum (Brown, 1990; Demarest, 1990; Guzman, 1983; Guzmán *et al.*, 1988; Ott, 1993; Stamets, 1996)
P. weldenii (Welden & Guzmán, 1978; Guzmán, 1983; Guzmán *et al.*, 1988)
P. xalapensis (Guzmán, 1983; Guzmán *et al.*, 1988)
P. yungensis (Wasson, 1957, see this in Wasson & Wasson, 1957; Heim & Wasson, 1958; Singer & Smith, 1958; Singer, 1959; Schultes & Hofmann, 1973; Guzmán, 1975b, 1977a, 1983, 1997; Schultes, 1976; Ott, 1976b, 1993; Cooke, 1977; Heim, 1978; Welden & Guzmán, 1978; Ott & Bigwood, 1978; Lipp, 1990, 1991; Herrera & Ulloa, 1990; Stamets, 1996)
P. zapotecorum (Wasson, 1957, see Wasson & Wasson, 1957; Heim, 1958a; Singer & Smith, 1958; Singer *et al.*, 1958; Heim & Hofmann, 1958; Heim & Wasson, 1958; Singer, 1958, 1959; Heim *et al.*, 1967; Guzmán, 1975b, 1977a, 1983, 1990a, 1997; Ott, 1976b, 1993; Schultes, 1976; Ott & Guzmán, 1976; Welden & Guzmán, 1978; Heim, 1978; Ott & Bigwood, 1978; Riedlinger, 1990, a color plate; Herrera & Ulloa, 1990; Stamets, 1996; Gartz, 1996)
Vascellum pratense (Heim *et al.*, 1967; Schultes & Hofmann, 1973, 1979; Ott *et al.*, 1975; Guzmán, 1977a, 1997; Heim, 1978)
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- V. qudenii* (Heim *et al.*, 1967; Schultes & Hofmann, 1973, 1979; Ott *et al.*, 1975; Guzmán, 1977a, 1997; Heim, 1978)

CENTRAL AMERICA

British Honduras (Belize)

- Copelandia cyanescens* (Gerhardt, 1996)
Psilocybe cordispora (Reid, 1970)
P. cubensis (Heim, 1956b, 1958c, 1978; Singer & Smith, 1958)

Costa Rica

- Amanita muscaria* (Sáenz *et al.*, 1983)
Claviceps paspali (Grasso, 1958)
Copelandia cyanescens (Sáenz *et al.*, 1983)
Psilocybe cf. *aztecorum* (Sáenz *et al.*, 1983)
P. cubensis (Sáenz *et al.*, 1983; Guzmán, 1995)
P. cf. mexicana (Sáenz *et al.*, 1983)

El Salvador

Claviceps paspali (Grasso, 1955)
Psilocybe subcubensis (Guzmán, 1983)

Guatemala

Amanita muscaria (Lowy, 1972, 1974, 1977; Cooke, 1977; Jenkins, 1977; Torres, 1984; Wasson *et al.*, 1986; Nyberg, 1992; Samorini, 1993; Ott, 1993; Wasson, 1995; Guzmán, 1997; Cooke, 1997)
Psilocybe cubensis (Guzmán, 1983; Torres, 1984)
P. mexicana (Lowy, 1977; Guzmán, 1983; Torres, 1984; Stamets, 1996)

Honduras

Psilocybe subcubensis (Guzmán, 1983, 1997)

Panamá

Psilocybe caerulescens var. *caerulescens* (Guzmán, 1983)
P. dumontii (Guzmán, 1983)

CARIBBEAN (including Bahamas and Bermuda)

Bahamas

Panaeolus papilionaceus (Gerhardt, 1996)

Bermuda

Claviceps paspali (Grasso, 1955)
Copelandia cyanescens (Gerhardt, 1996)

Cuba

Panaeolus papilionaceus (Gerhardt, 1996)
Psilocybe cubensis (Earle, 1906; Heim, 1956b, 1958c; Singer & Smith, 1958; Heim, 1978; Guzmán, 1983; Stamets, 1996; Gartz, 1996)
P. plutonia (Guzmán, 1983; Pegler, 1983)

Dominican Republic

Psilocybe cubensis (Rodríguez-Gallart, 1989; Guzmán, 1995)

Granada

Copelandia cyanescens (Gerhardt, 1996)

Guadalupe

Claviceps paspali (Grasso, 1955)
Panaeolus sphinctrinus (Ola'h, 1969)
P. subbalteatus (Ola'h, 1969)
Psilocybe cubensis (Pegler, 1983; Guzmán, 1995)

P. plutonia (Pegler, 1983)

Jamaica

Copelandia cyanescens (Pollock, 1976; Gartz, 1996)
Panaeolus fimicola (Gerhardt, 1996)
Psilocybe fuliginosa (Guzmán, 1983)
P. mammilata (Guzmán, 1983; Stamets, 1996)

Martinique

Claviceps paspali (Grasso, 1955)
Panaeolus sphinctrinus (Ola'h, 1969)
P. subbalteatus (Ola'h, 1969)
Psilocybe caerulescens var. *caerulescens* Pegler, 1983)
Claviceps paspali (Grasso, 1955)
P. cubensis (Pegler, 1983)
P. plutonia (Pegler, 1983)
P. yungensis (Pegler, 1983)

Puerto Rico

Claviceps paspali (Grasso, 1955)
Copelandia cyanescens (Navarro & Betancourt, 1992; Gerhardt, 1996)
Panaeolus fimicola (Gerhardt, 1996)
P. papilionaceus (Gerhardt, 1996)
P. sphinctrinus (Navarro & Betancourt, 1992)
Psilocybe cubensis (Heim, 1956b, c, 1978; Singer & Smith, 1958; Navarro & Betancourt, 1992; Guzmán *et al.*, 1997)
P. guilartensis (Guzmán *et al.*, 1997b)
P. portoricensis (Guzmán *et al.*, 1997b)

P. subcubensis (Navarro & Betancourt, 1992; Guzmán, 1995; Guzmán *et al.*, 1997)

San Vincent Island

Panaeolus papilionaceus (Pegler, 1983)

Trinidad

Copelandia cyanescens (Dennis, 1970)
Psilocybe cubensis (Singer & Smith, 1958; Dennis, 1970)

SOUTH AMERICA

Imprecise

Amanita muscaria (Hongo & Yokoyama, 1978)
Claviceps paspali (Mantle, 1977; Guzmán, 1997)
C. purpurea (Guzmán, 1997)
Copelandia cyanescens (Heim, 1978)
Gerronema fibula (Singer, 1969, 1970; Hongo, 1974)
Gymnopilus purpuratus (Singer, 1969; Stijve, 1995)
Panaeolus sphinctrinus (Ola'h, 1969; Treu, 1996)

P. subbalteatus (Ola'h, 1969)
Pluteus atricapillus (Singer, 1956)
P. glaucus (Singer, 1969)
Psilocybe cubensis (Bauer, 1992)

Argentina

Claviceps paspali (Grasso, 1955)
C. purpurea (Grasso, 1955)
Conocybe kuhneriana (Singer, 1969)
Gerronema fibula (Singer, 1970)

Gymnopilus sapineus (Guzmán, 1977b)
G. spectabilis (Guzmán, 1977b)
Panaeolina foenisecii (Gerhardt, 1996)
Panaeolus fimicola (Gerhardt, 1996)
P. retirugis (Singer, 1969)
P. sphinctrinus (Tyler & Groger, 1964; Singer, 1969; Pollock, 1976; Guzmán, 1977b)
P. subbalteatus (Singer *et al.*, 1958)
Psilocybe collybioides (Singer & Smith, 1958; Guzmán, 1983)
P. cubensis (Singer & Smith, 1958; Singer, 1960b; Guzmán, 1983)
P. hoogshagenii var. *hoogshagenii* (Guzmán, 1983)
P. wrightii (Guzmán, 1983)
P. zapotecorum (Singer & Smith, 1958, as *P. aggericola*; Guzmán, 1983; Stamets, 1996)

Bolivia

Claviceps paspali (Grasso, 1955)
Copelandia anomala (Pollock, 1976)
C. cyanescens (Singer, 1960; Stamets, 1996)
Gerronema fibula (Singer, 1970)
Psilocybe cubensis (Singer & Smith, 1958; Dennis, 1970; Guzmán, 1983)
P. mammilata (Guzmán, 1983; Stamets, 1996)
P. subcubensis (Guzmán, 1983)
P. yungensis (Singer & Smith, 1958; Guzmán, 1983; Ott, 1993; Stamets, 1996)

Brazil

Amanita muscaria (Homrich, 1965; Stijve, 1995; Stijve & Meijer, 1993)
Claviceps paspali (Grasso, 1955)
C. purpurea (Grasso, 1955)

Copelandia anomala (Pollock, 1976)
C. cyanescens (Singer, 1960a; Ola'h, 1969; Pollock, 1976; Stamets, 1996)
Gerronema fibula (Rick, 1961)

Gymnopilus spectabilis (Rick, 1961)
Panaeolina foenisecii (Rick, 1961; Stijve & Meijer, 1993)
Panaeolus fimicola (Rick, 1961)
P. papilionaceus (Rick, 1961; Pegler, 1997)
P. sphinctrinus (Ola'h, 1969, Stijve & Blake, 1994?)
P. subbalteatus (Ola'h, 1969; Stijve & Meijer, 1993; Stamets, 1996)
Pluteus glaucus (Stijve, 1995; Stijve & Meijer, 1993)
Psilocybe acutipilea (Guzmán, 1983; 1995; Guzmán *et al.*, 1984; Pegler, 1997)
P. blattariopsis (Guzmán, 1983; Pegler, 1997)
P. brasiliensis (Guzmán, 1983; Stamets, 1996; Pegler, 1997)
P. caeruleoannulata (Guzmán, 1983; Stijve & Meijer, 1993; Pegler, 1997)
P. caerulescens var. *caerulescens* (Stijve & Meijer, 1993; Stamets, 1996)
P. cubensis (Rick, 1961; Guzmán, 1983; Vinha, 1988; Stijve & Meijer, 1993; Gartz, 1996; Pegler, 1997)
P. farinacea (Guzmán, 1983, 1995; Singer, 1986)
P. furtadoana (Guzmán, 1983; Pegler, 1997)
P. hoogshagenii var. *hoogshagenii* (Stijve & Meijer, 1993; Stamets, 1996)
P. microcystidiata (Guzmán *et al.*, 1984)
P. paulensis (Guzmán, 1995; Guzmán *et al.*, 1984; Pegler, 1997)
P. paupera (Guzmán, 1983) (see discussion)
P. pericystis (Singer, 1989; Guzmán, 1995)
P. plutonia (Guzmán, 1983)
P. ramulosa (Guzmán *et al.*, 1984; Guzmán, 1995; Stijve & Meijer, 1993; Pegler, 1997)
P. cf. subyungensis (Stijve & Meijer, 1993)
P. uruguayensis (Stijve & Meijer, 1993)
P. zapotecorum (Guzmán, 1983; Stijve & Meijer, 1993; Stamets, 1996)

Chile

Amanita muscaria (Garrido, 1985; Valenzuela *et al.*, 1992)
Conocybe kuhneriana (Singer, 1969; Garrido, 1985; Valenzuela *et al.*, 1992)
Gerronema fibula (Singer, 1969; Garrido, 1985)
Gymnopilus purpuratus (Singer, 1969; Garrido, 1985; Kreisel & Lindequist, 1988; Gartz & Muller, 1990; Gartz, 1991a, b, c, 1996)
G. spectabilis (Singer, 1969; Garrido, 1985; Valenzuela *et al.*, 1992)
Panaeolina foenisecii (Singer, 1969, Garrido, 1985)
Panaeolus papilionaceus (Garrido, 1985; Valenzuela *et al.*, 1992)
P. retirugis (Garrido, 1985; Valenzuela *et al.*, 1992)
P. sphinctrinus (Singer, 1969; Garrido, 1985)
Pluteus atricapillus (Garrido, 1985; Valenzuela *et al.*, 1992)
P. glaucus (Garrido, 1985)
Psilocybe carbonaria (Singer, 1969; Guzmán, 1983; Garrido, 1985)
P. fimetaria (Singer, 1969; Guzmán, 1983; Stamets, 1996; Garrido, 1985)
P. lazoi (Singer, 1969; 1986; Guzmán, 1983, as *P. zapotecorum*)
P. liniformans var. *americana* (Guzmán, 1983; Garrido, 1985; Stamets, 1996)

- P. semilanceata* (Singer, 1969; Guzmán, 1983; Garrido, 1985; Redhead, 1989; Samorini, 1993; Stamets, 1996)
P. sierrae (Singer, 1969; Guzmán, 1983, 1995; Garrido, 1985; Stamets, 1996)
P. strictipes (Singer, 1969; Guzmán, 1983; Garrido, 1985; Stamets, 1996)
P. zapotecorum (Guzmán, 1983; Garrido, 1985; Stijve & Meijer, 1993)

Colombia

- Amanita muscaria* (Heim, 1978; Pulido, 1983; Velásquez *et al.*, 1998)
Copelandia cyanescens (Pulido, 1983; Gerhardt, 1996)
C. cambodginiensis (Ott & Guzmán, 1976)
Cordyceps capitata (Velásquez *et al.*, 1998)
Gerronema fibula (Singer, 1970; Pulido, 1983)

Panaeolina foeniseccii (Pulido, 1983)(Not Psychoactive)

Panaeolus papilionaceus (Gerhardt, 1996)
P. sphinctrinus (Pollock, 1976; Pulido, 1983)(Not Psychoactive)
Psilocybe angustipleurocystidiata (Guzmán, 1983)
P. antioquiensis (Guzmán *et al.*, 1994)
P. colombiana (Guzmán, 1983; Pulido, 1983)
P. cubensis (Heim, 1978; Guzmán, 1983; Pulido, 1983; Gartz, 1996)
P. guatapensis (Guzmán *et al.*, 1994)
P. heliconiae (Guzmán *et al.*, 1994)
P. hoogshagenii var. *hoogshagenii* (Stamets, 1996)
P. pintonii (Guzmán, 1983; Pulido, 1983)
P. subacutipilea (Guzmán *et al.*, 1994; Guzmán, 1995)
P. subcubensis (Guzmán, 1983, 1995; Pulido, 1983; Velásquez *et al.*, 1988, 1998)
P. yungensis (Guzmán, 1983; Ott, 1993; Stamets, 1996)
P. zapotecorum (Guzmán, 1983; Pulido, 1983; Stijve & Meijer, 1993; Pulido, 1983; Stamets, 1996)

Ecuador

- Claviceps paspali* (Ott, 1993)
P. subcubensis (Guzmán, 1983)
P. yungensis (Guzmán, 1983; Ott, 1993; Stamets, 1996)

French Guiana

- Psilocybe cubensis* (Courtecuisse *et al.*, 1996)

Peru

- Claviceps purpurea* (Grasso, 1955)
Gymnopilus spectabilis ? (Gartz, 1996)
Psilocybe cubensis (Repke *et al.*, 1977; Gartz, 1996)

P. yungensis ? (Gartz, 1996)

P. zapotecorum (Guzmán, 1983; Stamets, 1996)

Uruguay

- Gymnopilus spectabilis* (Hesler, 1969)
Panaeolus papilionaceus (Gerhardt, 1996)
Psilocybe caeruleoannulata (Guzmán, 1983)
P. uruguayensis (Guzmán, 1983; Stijve & Meijer, 1993)

Venezuela

- Claviceps paspali* (Grasso, 1955; Dennis, 1970)
C. purpurea (Grasso, 1955; Dennis, 1970)
Copelandia cyanescens (Gerhardt, 1996)
Gerronema fibula (Dennis, 1970)
Gymnopilus lateritius (Pegler & Calonge, 1997)
Panaeolus campanulatus (Dennis, 1970)
P. papilionaceus (Dennis, 1970; Gerhardt, 1996)
P. sphinctrinus (Dennis, 1970)
P. venezolanus (Guzmán, 1978c; Gerhardt, 1996)
Psilocybe caerulescens var. *caerulescens* (Guzmán, 1983; Stamets, 1996)
P. meridensis (Guzmán, 1995)
P. plutonia (Dennis, 1970; Pegler, 1983; Guzmán, 1983)
P. subcubensis (Guzmán, 1983; Marcano *et al.*, 1994)
P. subyugensis (Guzmán, 1983)

EUROPE**Widely distributed or no reported distribution**

- Amanita muscaria* (Kühner & Romagnesi, 1953; Ramsbottom, 1954; Wasson & Wasson, 1957; Heim, 1957b, 1958a, 1978; Singer, 1958; Hongo, 1959; Müller & Eugster, 1965; Wasson, 1968, 1979, 1980; Simons, 1971; Schultes & Hofmann, 1973, 1979; Schultes, 1976, 1990; Cooke, 1977; Phillips, 1981; Dickinson & Lucas, 1983; Moser, 1983; Wasson *et al.*, 1986; Bon, 1987a; Bresinsky & Besl, 1990; Demarest, 1990; Furst, 1992; Nyberg, 1992; Ott, 1993; Mckenna, 1993)
A. pantherina (Heim, 1957b, 1958a, b; Hongo, 1959; Phillips, 1981; Moser, 1983; Bon, 1987a; Bresinsky & Besl, 1990; Samorini, 1993)
A. regalis (Moser, 1983; Jenkins, 1986; Bresinsky & Besl, 1990; Kell, 1991; Stijve, 1995)
Claviceps nigricans (Ramsbottom, 1954; Schultes, 1976; Heim, 1978; Wasson *et al.*, 1978)
C. paspali (Mantle, 1977; Wasson *et al.*, 1978)
C. purpurea (Ramsbottom, 1954; Heim, 1957b, 1958b, 1978; Singer, 1958; Schultes & Hofmann, 1973, 1979; Mantle, 1977; Cooke, 1977; Ott & Bigwood, 1978; Wasson *et al.*, 1978; Phillips, 1981; Dickinson & Lucas, 1983; Bon, 1987a; Mckenna, 1990, 1993; Samorini, 1991)
Cordyceps capitata (Heim, 1957b; Bon, 1987a)

- C. ophioglossoides* (Heim, 1957b; Phillips, 1981; Dickinson & Lucas, 1983)
Conocybe cyanopus (Bresinsky & Besl, 1990; Gartz, 1996)
Copelandia cyanescens (Heim *et al.*, 1963; Schultes & Hofmann, 1979; Gerhard, 1987; Bresinsky & Besl, 1990; Ott, 1993; Gartz, 1996; Stamets, 1996)
Gerronema fibula (Hongo, 1959, 1974; Phillips, 1981; Moser, 1983)
Gymnopilus aeruginosus (Singer, 1986, page 660)
G. liquiritiae (Hongo, 1959; Samorini, 1989)
G. purpuratus (Singer, 1986, page 660; Samorini, 1989)
G. sapineus (Moser, 1983; Bon, 1987a)
G. spectabilis (Hongo, 1959; Phillips, 1981; Moser, 1983; Dickinson & Lucas, 1983; Singer, 1986, page 660; Bon, 1987a; Bresinsky & Besl, 1990; Gartz, 1996)
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- Inocybe aeruginascens* (Stijve *et al.*, 1985; Singer, 1986, page 601; Bresinsky & Besl, 1990; Samorini, 1993)
I. coelestium (Stijve *et al.*, 1985; Bresinsky & Besl, 1990)
I. corydalina var. *corydalina* (Heim, 1957b; Phillips, 1981; Moser, 1983; Stijve *et al.*, 1985; Singer, 1986, see page 601; Bon, 1987a; Bresinsky & Besl, 1990)
I. corydalina var. *erinaceomorpha* (Stijve *et al.*, 1985)
I. haemacta (Moser, 1983; Stijve *et al.*, 1985; Singer, 1986, page 601; Bon, 1987a; Bresinsky & Besl, 1990)
I. tricolor (Moser, 1983; Singer, 1986, page 601; Bresinsky & Besl, 1990)
Mycena cyanorrhiza (Heim, 1957b; Moser, 1983)
Panaeolina foenisecii (Kühner & Romagnesi, 1953; Heim, 1957b; Hongo, 1959; Ola'h, 1969; Kühner, 1980; Phillips, 1981; Moser, 1983; Bon, 1987a; Bresinsky & Besl, 1990; Stijve & Blake, 1994; Stamets, 1996)
Panaeolus ater (Kühner & Romagnesi, 1953; Ola'h, 1969; Moser, 1983; Bon, 1987a; Bresinsky & Besl, 1990; Stijve & Blake, 1994)
P. fimicola (Kühner & Romagnesi, 1953; Heim, 1957b, 1958b, 1978; Hongo, 1959; Ola'h, 1969; Moser, 1983; Bon, 1987a; Stijve & Blake, 1994; Stamets, 1996)
P. olivaceus (Stijve & Blake, 1994)
P. papilionaceus (Kühner & Romagnesi, 1953; Heim, 1957b, 1958b, 1978; Hongo, 1959; Moser, 1983; Bresinsky & Besl, 1990; Stijve & Blake, 1994)
P. retirugis (Kühner & Romagnesi, 1953; Heim, 1957b, 1958b; Hongo, 1959; Moser, 1983; Bresinsky & Besl, 1990)
P. sphinctrinus (Kühner & Romagnesi, 1953; Heim, 1957b, 1958b, 1978; Hongo, 1959; Singer, 1969; Ola'h, 1969; Phillips, 1981; Moser, 1983; Bon, 1987a; Bresinsky & Besl, 1990; Treu, 1996)
P. subbalteatus (Kühner & Romagnesi, 1953; Heim, 1958b, 1978; Hongo, 1959, 1976; Ola'h, 1969; Phillips, 1981; Moser, 1983; Bon, 1987a; Stijve, 1987; Bresinsky & Besl, 1990; Stijve & Blake, 1994; Stijve, 1995; Gartz, 1996; Stamets, 1996)

Pluteus atricapillus (Kühner & Romagnesi, 1953; Heim, 1957; Phillips, 1981; Moser, 1983; Dickinson & Lucas, 1983)
P. cyanopus (Singer, 1956; Moser, 1983; Gartz, 1996)
P. glaucus (Stijve, 1995)
P. nigriviridis (Bresinsky & Besl, 1990; Stijve, 1995)
P. salicinus (Singer, 1956; Heim, 1957b; Hongo, 1959; Phillips, 1981; Moser, 1983; Singer, 1986, page 459; Bon, 1987a; Bresinsky & Besl, 1990; Stijve, 1995)
P. villosus (Singer, 1956; Heim, 1957b; Moser, 1983)
Psilocybe coprinifacies (Pegler & Legon, 1998)
P. cyanescens (Kühner & Romagnesi, 1953; Kühner, 1980; Margot & Watling, 1981; Phillips, 1981; Moser, 1983; Bresinsky & Besl, 1990; Gartz, 1996)
P. liniformans var. *liniformans* (Bresinsky & Besl, 1990; Pegler & Legon, 1998)
P. maire (Pegler & Legon, 1998)
P. semilanceata (Kühner & Romagnesi, 1953; Heim, 1957b; Cooke, 1977; Ott & Bigwood, 1978; Kühner, 1980; Phillips, 1981; Margot & Watling, 1981; Moser, 1983; Dickinson & Lucas, 1983; Bon, 1987a; Bresinsky & Besl, 1990; Turner & Sczawinski, 1991; Furst, 1992; Stijve, 1995; Stamets, 1996; Gartz, 1996)
P. serbica (Moser, 1983; Pegler & Legon, 1998)
P. silvatica (Stamets, 1996, norther reg.)
P. strictipes (Samorini, 1992)
P. pelliculosa (Bresinsky & Besl, 1990)
Vascellum pratense (Phillips, 1981, and many others; a species very common)

Austria

Claviceps purpurea (Grasso, 1955)
Copelandia cyanescens (Stijve, 1992; Gerhardt, 1996)
Inocybe coelestium (Stijve & Kuyper, 1985; Stijve *et al.*, 1985; Kuyper, 1986; Stamets, 1996)

I. corydalina var. *corydalina* (Stijve & Kuyper, 1985; Stijve *et al.*, 1985; Kuyper, 1986; Gartz, 1986a)
I. haemacta (Stijve & Kuyper, 1985; Stijve *et al.*, 1985; Kuyper, 1986)
I. tricolor (Kuyper, 1986)
Panaeolina foenisecii (Bresinsky & Besl, 1990; Allen & Merlin, 1992c)
Panaeolus fimicola (Gerhardt, 1996)
Psilocybe bohémica (Stamets, 1996)
P. cyanescens (Moser, 1983?; Gartz, 1996)
P. semilanceata (Guzmán, 1983; Moser, 1983?; Samorini, 1992; Gartz, 1996)
P. serbica (Moser, 1983?)

Azores

Gymnopilus spectabilis (Dennis, 1986)

Panaeolina foenisecii (Dennis, 1986)

Belgium

Amanita muscaria (Jenkins, 1977)

Claviceps purpurea (Heim, 1978)

Psilocybe cyanescens (Gartz, 1996)

P. semilanceata (Samorini, 1992; Gartz, 1996)

Bulgaria

Claviceps purpurea (Grasso, 1955)

Inocybe corydalina var. *corydalina* (Kuyper, 1986)

I. corydalina var. *erinaceomorpha* (Kuyper, 1986)

I. haemacta (Kuyper, 1986)

Psilocybe semilanceata (Kutan & Kotlaba, 1988; Guzmán, 1995)

Canary Islands

Panaeolus sphinctrinus (Dennis, 1986; Treu, 1996)

Czechoslovakia

Panaeolina foenisecii (Gerhardt, 1996)

Panaeolus olivaceus (Gerhardt, 1996)

P. papilionaceus (Gerhardt, 1996)

Pluteus atricapillus (Vacek, 1948)

P. salicinus (Vacek, 1948)

Psilocybe bohémica (Sebek, 1983, 1985; Wurst *et al.*, 1984; Semerdzieva & Wurst, 1986; Semerdzieva *et al.*, 1986; Kysilka & Wurst, 1989; Gartz & Muller, 1989; Guzmán, 1995; Gartz, 1996; Stamets, 1996)

P. coprinifacies (Herink, 1950; Pouzar, 1953; Semerdzieva & Nerud, 1973; Auert *et al.*, 1980; Guzmán, 1983; Wurst *et al.*, 1984; Semerdzieva *et al.*, 1986; Ott, 1993)

P. cyanescens (Sebek, 1985; Guzmán, 1995)

P. fimetaria (Guzmán, 1983; Stamets, 1996)

P. mairei (Semerdzieva & Nerud, 1973; Auert *et al.*, 1980; Guzmán, 1983, 1995; Wurts *et al.*, 1984; Kubicka, 1985; Semerdzieva & Wurst, 1986; Kysilka & Wurst, 1989)

P. semilanceata (Semerdzieva & Nerud, 1973; Auert *et al.*, 1980; Guzmán, 1983, 1995; Wurst *et al.*, 1984; Kubicka, 1985; Kutan & Kotlaba, 1988; Sebeck, 1985; Samorini, 1992; Gartz, 1996)

P. serbica (Sebeck, 1985; Guzmán, 1983, 1995; Stamets, 1996)

P. strictipes (Guzmán, 1983, 1995; Sebek, 1985; Stamets, 1996)

Denmark

Claviceps paspali (Grasso, 1955; Heim, 1978)

C. purpurea (Grasso, 1955)

Inocybe haemacta (Kuyper, 1986)
Panaeolina foenisecii (Gerhardt, 1996)
Panaeolus ater (Pollock, 1976)

P. fimicola (Gerhardt, 1996)

P. olivaceus (Gerhardt, 1996)
Psilocybe fimetaria (Guzmán, 1983)
P. semilanceata (Guzmán, 1983; Samorini, 1992; Gartz, 1996)

Estonia

Claviceps purpurea (Grasso, 1955)
Psilocybe semilanceata (Urbonas *et al.*, 1986; Guzmán, 1995)

Faeroe Islands

Panaeolus moellerianus (Möeller, 1945; Singer, 1960)
Psilocybe semilanceata (Möeller, 1945; Guzmán, 1983)

Finland

Amanita muscaria (Heim, 1958a)
Amanita regalis (Kell, 1991)
Conocybe cyanopus (Christiansen *et al.*, 1984; Ohenoja *et al.*, 1987; Stamets, 1996)
C. kuehneriana (Ohenoja *et al.*, 1987)
Pluteus atricapillus (Ohenoja *et al.*, 1987)
P. salicinus (Ohenoja *et al.*, 1987; Gartz, 1996)
Panaeolus olivaceus (Ohenoja *et al.*, 1987; Gerhardt, 1996)
P. papilionaceus (Gerhardt, 1996)
Psilocybe fimetaria (Guzmán, 1983; Stamets, 1996)
P. pelliculosa (Guzmán, 1983)
P. semilanceata (Guzmán, 1983; Jokiranta *et al.*, 1984; Samorini, 1992; Gartz, 1996)
P. silvatica (Guzmán, 1983; Stamets, 1996)
P. strictipes (Guzmán, 1983, 1995; Stamets, 1996)

France

Amanita muscaria (Ramsbottom, 1954; Heim, 1958a; Locquin-Linard, 1965a, b, 1966a, b, 1967; Schultes & Hofmann, 1979; Dickinson & Lucas, 1979; Samorini, 1993, 1996, 1997; Wasson, 1995)
A. pantherina (Chilton & Ott, 1976; Jenkins, 1977; Samorini, 1996)
Claviceps purpurea (Grasso, 1955; Cooke, 1977; Heim, 1957c, 1978)
Copelandia anomala (Pollock, 1976)
C. cyanescens (Heim, 1978; Heim *et al.*, 1966b; Pollock, 1976; Schultes & Hofmann, 1979; Samorini, 1989; Stamets, 1996)
C. cyanopus (Heim, 1978)
Inocybe aeruginascens (Kuyper, 1986)

I. corydalina var. *corydalina* (Kuyper, 1986)
I. haemacta (Kuyper, 1986)
Panaeolina foenisecii (Pollock, 1976)
Panaeolus papilionaceus (Gerhardt, 1996)
P. subbalteatus (Heim *et al.*, 1967; Pollock, 1976; Heim, 1978)
Pluteus salicinus (Gartz, 1996)
Psilocybe cyanescens (Chilton, 1978; Gartz, 1996)
P. semilanceata (Heim *et al.*, 1967; Heim, 1978; Guzmán, 1983; Festi, 1985; Bon, 1987a; Stamets, 1996; Gartz, 1996; Gartz *et al.*, 1996)
P. strictipes (Heim, 1957b; Huijsman, 1961; Guzmán, 1983; Bon, 1987a; Stamets, 1996)
Inocybe corydalina var. *corydalina* (Stijve & Kuyper, 1985)

Georgia

Psilocybe semilanceata (Redhead, 1989)

Germany

Amanita muscaria (Heim, 1958a; Wieland, 1968; Jenkins, 1977; Derbsch & Schmitt, 1984 & 1987; Samorini, 1992; Ott, 1993)

A. pantherina (Derbsch & Schmitt, 1984 & 1987; Samorini, 1992; Ott, 1993)
Claviceps purpurea (Grasso, 1955; Heim, 1957c, 1978; Derbsch & Schmitt, 1984 & 1987)
Cordyceps capitata (Derbsch & Schmitt, 1987)
C. ophioglossoides (Derbsch & Schmitt, 1987)
Conocybe cyanopus (Gartz, 1996; Stamets, 1996)
Galerina steglichii (Besl, 1993; Gartz, 1995, 1996)
Gerronema fibula (Gartz, 1986a)
G. solipes (Gartz, 1986a; Stijve & Kuyper, 1988, later analysed these two species and failed to find any indole compounds)
Gymnopilus liquiritae (Derbsch & Schmitt, 1984 & 1987)
G. purpuratus (Kreisel & Lindequist, 1988; Gartz & Muller, 1990; Gartz, 1996, 1989c)
G. sapineus (Derbsch & Schmitt, 1984 & 1987)
G. spectabilis (Derbsch & Schmitt, 1984 & 1987)
Inocybe aeruginascens (Babos, 1968; Drewitz, 1983; Hohmeyer, 1984; Gartz, 1985a, 1986a, 1986b, 1986d, 1987a, 1989, 1995b, 1996; Gartz & Drewitz, 1985, 1986; Stijve *et al.*, 1985; Stijve & Kuyper, 1985; Semerdzieva *et al.*, 1986; Kuyper, 1986)
I. coelestium (Stijve & Kuyper, 1985; Stijve *et al.*, 1985; Kuyper, 1986; Stamets, 1996)
I. corydalina var. *corydalina* (Kuyper, 1986; Derbsch & Schmitt, 1984 & 1987)
I. corydalina var. *erinaceomorpha* (Stijve & Kuyper, 1985; Stijve *et al.*, 1985; Kuyper, 1986)
I. haemacta (Kuyper, 1986; Gartz, 1986; Derbsch & Schmitt, 1984 & 1987)

Panaeolina foeniseccii (Derbsch & Schmitt, 1984 & 1987; Gerhardt, 1996)
Panaeolus ater (Derbsch & Schmitt, 1984 & 1987; Gerhardt, 1996)
P. fimicola (Derbsch & Schmitt, 1984 & 1987; Gerhardt, 1996)
P. papilionaceus (Derbsch & Schmitt, 1984 & 1987)
P. retirugis (Derbsch & Schmitt, 1984 & 1987; Gartz, 1996)
P. sphinctrinus (Derbsch & Schmitt, 1984 & 1987)
P. subbalteatus (Derbsch & Schmitt, 1984 & 1987; Bresinsky & Besl, 1990; Gartz, 1996)
Pluteus atricapillus (Derbsch & Schmitt, 1984 & 1987)
P. cyanopus (Derbsch & Schmitt, 1984 & 1987)
P. salicinus (Derbsch & Schmitt, 1984 & 1987; Gartz, 1996)
P. villosus (Derbsch & Schmitt, 1984 & 1987)
Psilocybe azurescens (Stamets, 1996)
P. bohémica (Stamets, 1996)
P. cyanescens (Bresinsky & Haas, 1976; Gartz, 1986; 1996; Krieglsteiner, 1986; Müller & Gartz, 1986; Stamets, 1996)
P. mairei (Derbsch & Schmitt, 1984 & 1987; Guzmán, 1995)
P. semilanceata (Guzmán, 1983; Derbsch & Schmitt, 1984 & 1987; Kell, 1991; Samorini, 1992; Gartz, 1996)
P. serbica (Bresinsky & Haas, 1976)
P. strictipes (Guzmán, 1983; Stamets, 1996)

Great Britain (included Ireland, Hebrides Islands and Shetland Islands)

Amanita muscaria (Ramsbottom, 1954; Heim, 1958a, 1978; Bowden & Drysdale, 1965; Pegler, 1965; Wakefield & Dennis, 1981; Dennis, 1986; Olbridge *et al.*, 1989; McKenna, 1990; Ott, 1993; Wasson, 1995)
A. pantherina (Pegler, 1965; Wakefield & Dennis, 1981; Olbridge *et al.*, 1989)
Claviceps nigricans (Dennis, 1968)
C. purpurea (Ramsbottom, 1954; Grasso, 1955; Dennis, 1968; Cooke, 1977)
Conocybe kuehneriana (Watling, 1982; Dennis, 1986; Ohenoja *et al.*, 1987)
Copelandia cyanescens (Keay & Brown, 1990)

Gerronema fibula (Pegler, 1965)

Gymnopilus liquiritiae (Watling & Gregory, 1993)

G. purpuratus (Pegler, 1965; Gartz, 1996)

G. sapineus (Pegler, 1965; Hesler, 1969; Wakefield & Dennis, 1981; Buczacki, 1989; Watling & Gregory, 1993)

G. spectabilis (Pegler, 1965; Hesler, 1969; Wakefield & Dennis, 1981; Dennis, 1986; Buczacki, 1989; Olbridge *et al.*, 1989; Stamets, 1996)

Inocybe corydalina var. *corydalina* (Wakefield & Dennis, 1981; Dennis, 1986; Buczacki, 1989; Stamets, 1996)

I. haemacta (Kuyper, 1986; Stamets, 1996)

Panaeolina foeniseccii (Ola'h, 1969; Singer, 1969; Robbers *et al.*, 1969; Fiusello & Ceruti-Scurti, 1972; Watling, 1979; Wakefield & Dennis, 1981; Stijve *et al.*, 1984; Gartz, 1985c; Dennis, 1986; Ohenoja *et al.*, 1987; Watling &

Gregory, 1987; Oldrige *et al.*, 1989; Bresinsky & Besl, 1990; Allen & Merlin, 1992c; Gerhardt, 1996)

Panaeolus ater (Wakefield & Dennis, 1981; Watling & Gregory, 1987; Dennis, 1986; Buczacki, 1989)

P. castaneifolius (Dennis, 1986; Gerhardt, 1996)

P. fimicola (Heim, 1958b; Dennis, 1986; Watling & Gregory, 1987; Gerhardt, 1996)

P. olivaceus (Dennis, 1986; Watling & Gregory, 1987; Gerhardt, 1996)

P. papilionaceus (Corner, 1934; Heim, 1978; Dennis, 1986; Watling & Gregory, 1987; Gerhardt, 1996)

P. retirugis (Watling & Gregory, 1987)

P. sphinctrinus (Corner, 1934; Dennis, 1986; Watling & Gregory, 1987; Olbridge *et al.*, 1989)

P. subbalteatus (Watling, 1977; Dennis, 1986; Watling & Gregory, 1987; Olbridge *et al.*, 1989; Gartz, 1996)

Pluteus atricapillus (Ramsbottom, 1954; Wakefield & Dennis, 1981; Orton, 1986)

P. salicinus (Dennis, 1986; Stamets, 1996)

Psilocybe cyanescens (Singer & Smith, 1958; Ott & Bigwood, 1978; Guzmán, 1983; Watling & Gregory, 1987; Johnston & Buchanan, 1995; Gartz, 1996; Stamets, 1996; Pegler & Legon, 1998)

P. fimetaria (Benedict *et al.*, 1967; Chilton, 1978; Guzmán, 1983; Watling & Gregory, 1987; Stamets, 1996)

P. semilanceata (Sowerby 1797-1809; Cooke, 1881-1891; 1902-1906; Ramsbottom, 1953; Benedict *et al.*, 1962; Heim *et al.*, 1967; Chilton, 1978; Seaby & McIlvaine, 1982; Guzmán, 1983; Dennis, 1986; Watling & Gregory, 1987; Oldridge *et al.*, 1989; Samorini, 1992; Gartz, 1996)

P. strictipes (Guzmán, 1983; Watling & Gregory, 1987; Stamets, 1996)

Greece

Amanita muscaria (Pantidou, 1991; Samorini, 1993; Zervakis *et al.*, 1998)

A. pantherina (Pantidou, 1991; Zervakis *et al.*, 1998)

Claviceps nigricans (Wasson *et al.*, 1978)

C. paspali (Wasson *et al.*, 1978)

C. purpurea (Wasson *et al.*, 1978; Schultes & Hofmann, 1979; Riedlinger, 1990; Ruck, 1990; Wasson, 1994; García-Terrés, 1994)

Panaeolina foenisecii (Zervakis *et al.*, 1998)

Panaeolus retirugis (Zervakis *et al.*, 1998)

P. sphinctrinus (Pantidou, 1991; Zervakis *et al.*, 1998)

Holland (The Netherlands)

Amanita muscaria (Wieland, 1968; Jenkins, 1977)

Claviceps purpurea (Grasso, 1955; Heim, 1957c, 1978)

Conocybe kuehneriana (Ohenoja *et al.*, 1987; Gartz, 1996)

Gerronema fibula (Stijve & Kuyper, 1988)

Gymnopilus purpuratus (Gartz, 1989)

G. spectabilis (Stijve & Kuyper, 1988)

Inocybe aeruginascens (Stijve & Kuyper, 1985; Kuyper, 1986; Gartz, 1996)

I. corydalina var. *corydalina* (Kuyper, 1986)

I. corydalina var. *erynaceomorpha* (Kuyper, 1986)

I. haemacta (Kuyper, 1986; Stamets, 1996)

Panaeolus papilionaceus (Gerhardt, 1996)

Pluteus salicinus (Gartz, 1995b, 1996)

Psilocybe cyanescens (Tjallingii-Beckers, 1976; Guzmán, 1983; Gartz, 1996)

P. liniformans var. *liniformans* (Guzmán, 1983; Stijve & Kuyper, 1985; Stamets, 1996)

P. puberula (Bas & Noordeloos, 1996)

P. semilanceata (Guzmán, 1983; Stijve, 1984; Samorini, 1992; Gartz, 1996; Stamets, 1996)

P. strictipes (Guzmán, 1983; Stamets, 1996)

Hungary

Claviceps purpurea (Grasso, 1955)

Inocybe aeruginascens (Kuyper, 1986; Gartz, 1995b, 1996)

Pluteus nigroviridis (Gartz, 1996)

Psilocybe semilanceata (Gartz, 1996)

Iceland

Panaeolina foenisecii (Dennis, 1986)

Panaeolus ater (Dennis, 1986)

P. fimicola (Dennis, 1986)

P. papilionaceus (Dennis, 1986)

P. sphinctrinus (Dennis, 1986; Treu, 1996)

P. subbalteatus (Dennis, 1986)

Ireland

P. semilanceata (Seaby & McIlvaine, 1982)

Italy

Amanita muscaria (Samorini, 1989; 1993, 1996)

A. pantherina (Samorini, 1989, 1993)

Claviceps paspali (Grasso, 1955; Ott, 1993)

C. purpurea (Grasso, 1949, 1955; Samorini, 1991)

Copelandia anomala (Pollock, 1976)

C. cyanescens (Pollock, 1976; Festi, 1985; Samorini, 1989, 1993)

Gerronema fibula (Samorini, 1993)

Gymnopilus liquiritiae (Samorini, 1989)

G. purpuratus (Samorini, 1989)

- G. spectabilis* (Samorini, 1989, 1993)
Inocybe corydalina (Samorini, 1989, 1993)
I. haemacta (Samorini, 1993)
I. tricolor (Samorini, 1989)
Mycena cyanorhiza (Samorini, 1989, 1993)
Panaeolina foenisecii (Gitti *et al.*, 1983; Samorini, 1989, 1993; Bresinsky & Besl, 1990)
Panaeolus ater (Samorini, 1989, 1993)
P. fimicola (Samorini, 1989, 1993)
P. papilionaceus (Gitti *et al.*, 1983; Gerhardt, 1996; Cacialli *et al.*, 1995)
P. retirugis (Fiusello & Ceruti-Scurti, 1971; Chilton, 1978; Gitti *et al.*, 1983; Cacialli *et al.*, 1995)
P. sphinctrinus (Gitti *et al.*, 1983; Samorini, 1989, 1993; Cacialli *et al.*, 1995)
P. subbalteatus (Gitti *et al.*, 1983; Festi, 1985; Samorini, 1989, 1993; Cacialli *et al.*, 1995)

Pluteus cyanopus (Samorini, 1989, 1993)
P. salicinus (Samorini, 1989, 1993)
Psilocybe cyanescens (Samorini, 1989, 1992; Grilli, 1990; Guzmán, 1995; Stamets, 1996)
P. fimetaria (Samorini, 1989)
P. semilanceata (Guzmán, 1983, 1995; Gitti *et al.*, 1983; Festi, 1985; Samorini, 1988, 1989, 1992; Gartz, 1996; Stamets, 1996)
P. strictipes (Samorini, 1988, 1989, 1992)

Lithuania

- Psilocybe semilanceata* (Urbonas *et al.*, 1986)

Macedonia

- Panaeolus papilionaceus* (Gerhardt, 1996)

Maderia

- Gymnopilus spectabilis* (Dennis, 1986)

Norway

- Amanita muscaria* (Heim, 1958a; Schultes, 1976; Wasson, 1967; Samorini, 1993; Gartz, 1996)
A. regalis (BMS Overseas Foray, Tömte, Norway)
Conocybe cyanopus (Christiansen *et al.*, 1984; Ohenoja *et al.*, 1987; Stamets, 1996; Gartz, 1991b, 1996)
Gymnopilus spectabilis (Ott, 1993)
Panaeolina foenisecii (Allen & Merlin, 1992c)
Panaeolus papilionaceus (Gerhardt, 1996)
Pluteus salicinus (Christiansen *et al.*, 1984; Gartz, 1996)
Psilocybe fimetaria (Stamets, 1996)

P. semilanceata (Høiland, 1978; Guzmán, 1983; Samorini, 1992; Gartz, 1996; Stamets, 1996)
P. serbica? (Høiland, 1978 as *P. atrobrunnea*)

Poland

Amanita muscaria (Wieland, 1968)
Claviceps purpurea (Grasso, 1955; Heim, 1957c, 1978)
P. semilanceata (Gartz, 1996)

Portugal

Amanita muscaria (Castro, 1998)
A. pantehrina (Castro, 1998)

Rumania

Claviceps purpurea (Grasso, 1955; Heim, 1978)
Psilocybe semilanceata (Gartz, 1996)

Russia (including Siberia)

Amanita muscaria (Wasson & Wasson, 1957; Heim, 1958a, 1978; Singer, 1958, 1959; Benedic *et al.*, 1966; Wasson, 1968, 1979, 1995; Wieland, 1968; Chilton *et al.*, 1974; Schultes, 1976, 1990; Cooke, 1977; Schultes & Hofmann, 1979; Dickinson & Lucas, 1983; McKenna, 1990; Furst, 1992; Nyberg, 1992; Samorini, 1993; Ott, 1993; Mekenna, 1993; Hobbs, 1995; Gartz, 1996)
A. regalis (Kell, 1991; Stijve, 1995)
Claviceps purpurea (Grasso, 1955; Heim, 1957c, 1978)
Gymnopilus liquiritae (Hongo, 1959)
G. spectabilis (Dennis, 1986)
Inocybe corydalina (Dennis, 1986)
Panaeolus papilionaceus (Hongo, 1959; Dennis, 1986; Gerhardt, 1996)
P. sphinctrinus (Dennis, 1986; Treu, 1996)
P. subbalteatus (Gurevich, 1993; Stamets, 1996)
Pluteus salicinus (Dennis, 1986)
Psilocybe semilanceata (Guzmán, 1983; Samorini, 1992; Gartz, 1996)
P. strictipes (Stamets, 1996)

Spain

Amanita muscaria (Calonge, 1975; Moreno *et al.*, 1986; Laskibar & Palacios, 1991; Ott, 1993; Samorini, 1996; Piqueras, 1955, 1996; Castro, 1998)
A. pantherina (Calonge, 1975; Moreno *et al.*, 1986; Laskibar & Palacios, 1991)
Claviceps purpurea (Calonge, 1975; Piqueras, 1955, 1996)
Copelandia cyanescens (Festi, 1985; Moreno *et al.*, 1986)
Gerronema fibula (Moreno *et al.*, 1986)
Gymnopilus spectabilis (Moreno *et al.*, 1986; Laskibar & Palacios, 1991)
Panaeolina foenisecii (Moreno *et al.*, 1986)
Panaeolus fimicola (Moreno *et al.*, 1986)

P. papilionaceus (Moreno *et al.*, 1986)
P. sphinctrinus (Moreno *et al.*, 1986; Laskibar & Palacios, 1991)
Pluteus atricapillus (Moreno *et al.*, 1986; Laskibar & Palacios, 1991)
P. salicinus (Moreno *et al.*, 1986)
Psilocybe cyanescens (Stamets, 1996)
P. hispanica (Guzmán, 1999a)
P. semilanceata (Moreno *et al.*, 1986; Becker, 1989; Samorini, 1994; Guzmán, 1995, 1999a; Gartz, 1996; Palacios, 1997)

Sweden

Amanita muscaria (Heim, 1958a; Jenkins & Petersen, 1976; Ott, 1993)
A. pantherina (Jenkins, 1977; Stijve, 1995)
A. regalis (Kell, 1991; Stijve, 1995)
Claviceps purpurea (Heim, 1957c)
Panaeolina foenisecii (Gerhardt, 1996)
Panaeolus olivaceus (Gerhardt, 1996)
P. papilionaceus (Gerhardt, 1996)
Pluteus salicinus (Gartz, 1996)
Psilocybe cyanescens (Stamets, 1996)
P. semilanceata (Guzman, 1983; Stijve, 1984; Samorini, 1992; Redhead, 1989)

P. silvatica (Guzmán, 1983)
P. strictipes (Guzmán, 1983; Stamets, 1996)

Switzerland

Amanita muscaria (Favre, 1955; Good *et al.*, 1965; Eugster, 1969; Catalfomo & Eugster, 1970; Bresinsky & Besl, 1990; Ott, 1993; Stijve, 1995)
A. pantherina (Bresinsky & Besl, 1990)
A. regalis (Stijve, 1995)
Claviceps purpurea (Heim, 1957c, 1978)
Copelandia cyanescens (Gerhardt, 1996)
Galerina steglichii (Besl, 1994)
Gerronema fibula (Favre, 1955; Stijve & Kuyper, 1988)
Gymnopilus liquiritiae (Favre, 1955)
G. sapineus (Favre, 1955)
G. spectabilis (Stijve & Kuyper, 1988)
Inocybe aeruginescens (Stijve & Kuyper, 1985; Gartz, 1995b, 1996)
I. calamistrata (Favre, 1955)
I. haemacta (Stijve & Meijer, 1993)
I. corydalina (Stijve & Meijer, 1993)
Mycena cyanorhiza (Favre, 1955)
Panaeolina foenisecii (Favre, 1955; Allen & Merlin, 1992c; Stijve & Meijer, 1993; Gerhardt, 1996)
Panaeolus fimicola (Favre, 1955)

P. olivaceus (Gerhardt, 1996)
P. papilionaceus (Favre, 1955)
Pluteus salicinus (Gartz, 1996)
Psilocybe cyanescens (Gartz, 1996)
P. semilanceata (Stijve & Meijer, 1993; Stijve, 1995; Samorini, 1992; Gartz, 1996; Stamets, 1996)

Ukraine

Amanita muscaria (Ott, 1993; Minter & Dudka, 1996)
A. pantherina (Minter & Dudka, 1996)
Claviceps purpurea (Minter & Dudka, 1996)
Cordyceps capitata (Minter & Dudka, 1996)
C. ophioglossoides (Minter & Dudka, 1996)
Panaeolus ater (Minter & Dudka, 1996)
P. papilionaceus (Minter & Dudka, 1996)
P. sphinctrinus (Minter & Dudka, 1996)
Pluteus atricapillus (Minter & Dudka, 1996)
P. salicinus (Minter & Dudka, 1996)
P. villosus (Minter & Dudka, 1996)

Yugoslavia

Claviceps purpurea (Grasso, 1955)
Psilocybe serbica (Moser & Horak, 1968; Semerdzieva & Nerud, 1973; Chilton, 1978; Guzmán, 1983; Stamets, 1996)

AFRICA

Widely distributed or no reported distribution

Amanita muscaria (Hongo, 1959)
A. pantherina (Hongo, 1959)
Claviceps paspali Grasso, 1955)
C. purpurea (Abou-Chaar *et al.*, 1961; Wasson *et al.*, 1978, northern; Dickinson & Lucas, 1983)
Copelandia tropicalis (Ola'h, 1969; Weeks *et al.*, 1979; Gartz, 1996; Stamets, 1996)
Gymnopilus spectabilis (Hongo, 1959; Dennis, 1986, northern Africa)
Inocybe corydalina (Dennis, 1986, northern Africa)
Panaeolina foenisecii (Hongo, 1959)
Panaeolus africanus (Gartz, 1996)
P. fimicola (Dennis, 1986, North Africa; Ola'h, 1969; Stamets, 1996)
P. microscopus (Ola'h, 1970)
P. papilionaceus (Hongo, 1959; Dennis, 1986, North Africa)
P. retirugis (Hongo, 1959)
P. sphinctrinus (Dennis, 1986 & Treu, 1996, both in North Africa)
P. subbalteatus (Ola'h, 1969; Hongo, 1959, 1976; Stamets, 1996; Pollock, 1976)

P. tropicalis (Ola'h, 1969)
Pluteus salicinus (Dennis, 1986, North Africa)
Psilocybe cyanescens (Gartz, 1996)
P. goniospora (Pegler, 1977; Guzmán, 1983)

Algeria

Claviceps purpurea (Grasso, 1955)
Psilocybe mairei (Malençon & Bertault, 1970; Singer & Smith, 1958; Guzmán, 1983)

Chad

Panaeolus africanus (Ola'h, 1968, 1969, 1970; Stamets, 1996)

Ethiopia

Claviceps purpurea (Hawksworth *et al.*, 1955)

Ivory coast

Claviceps paspali (Grasso, 1955)
Conocybe sp? (Samorini, 1995)
Psilocybe sp? (Samorini, 1995)

Kenya

Panaeolus sp. (Vedcourt & Trump, 1969)
P. aquamarina (Pegler, 1977; Guzmán, 1995)
P. cubensis ? (as *Stropharia* sp. cf. *cubensis*, Vedcourt & Trump, 1969)
P. cubensis ? (was not a determined mushroom, close to *Stropharia*, Cullinan & Henry, 1945; Heim, 1978)
Psilocybe sp. (identified as *Stropharia* sp., Charters, 1957, 1958)

Madagascar (Malagasy Republic)

Copelandia cyanescens (Heim *et al.*, 1967; Pollock, 1976; Heim, 1978)

Mauricio Island

Claviceps paspali (Grasso, 1955)
C. purpurea (Grasso, 1955)

Morocco (Maroc)

Amanita muscaria (Malençon & Bertault, 1970)
A. pantherina (Malençon & Bertault, 1970)
Copelandia bispora (Stamets, 1996; Weeks *et al.*, 1979)
Inocybe calamistrata (Malençon & Bertault, 1970)
I. corydalina (Malençon & Bertault, 1970)
Panaeolus fimicola (Malençon & Bertault, 1970)
P. papilionaceus (Malençon & Bertault, 1970)
Pluteus cyanopus (Malençon & Bertault, 1970)

Pluteus atricapillus Malençon & Bertault, 1970)
P. salicinus (Malençon & Bertault, 1970)
P. villosus (Malençon & Bertault, 1970; Stijve & Kuyper, 1985)
Psilocybe mairei (Singer & Smith, 1958; Malençon & Bertault, 1970;
 Guzmán, 1983; Gartz, 1996; Stamets, 1996)

Republic of Central Africa

Panaeolus africanus (Ola'h, 1968, 1969; Gerhardt, 1996; Stamets, 1996)
P. microsporus (Ola'h, 1969, 1970; Gerhardt, 1996)
Pluteus atricapillus (Horak, 1978; Ohenoja *et al.*, 1987)

Rhodesia

Claviceps paspali (Lovelien, 1964; Cooke, 1977)

South Africa

Amanita muscaria (Watt & Breyer-Brandwijk, 1962; Wieland, 1968; Ott, 1993)
A. pantherina (Watt & Breyer-Brandwijk, 1962); Ott, 1993)
Panaeolina foenisecii (Watt & Breyer-Brandwik, 1962)
Panaeolus papilionaceus (Watt & Breyer-Brandwijk, 1962)
P. retirugis (Watt & Breyer-Brandwik, 1962)
P. subbalteatus (Watt & Breyer-Brandwik, 1962)
Pluteus salicinus (Stamets, 1996)
Psilocybe natalensis (Gartz *et al.*, 1995; Gartz, 1996; Stamets, 1996)
P. semilanceata?(Samorini, 1993)

Sudan

Panaeolus africanus (Ola'h, 1968, 1969, 1970; Stamets, 1996)

Tanzania

Amanita muscaria (Härkönen, 1995; Härkönen *et al.*, 1994)
Copelandia tropicalis (Gerhardt, 1996)
Pluteus atricapillus (Pegler, 1977)

Uganda

Panaeolus papilionaceus (Gerhardt, 1996)
Psilocybe goniospora (Pegler, 1977)

Zaire

Copelandia cyanescens (Gerhardt, 1996)
Panaeolina foenisecii (Gerhardt, 1996)

ASIA

no reported distribution

Amanita muscaria (Hongo, 1959; Wasson *et al.*, 1986)
Claviceps purpurea (Dickinson & Lucas, 1983)
Gerronema fibula (Singer, 1970, Eastern; Hongo, 1974)
Gymnopilus liquiritiae (Hongo, 1959)
Panaeolus foenisecii (Hongo, 1959)

Bali

Copelandia cyanescens (Schultes & Hofmann, 1973; Weeks *et al.*, 1979;
 Merlin & Allen, 1993; Gartz, 1996)

Borneo (see also Indonesia)

Boletus flammeus (Corner, 1972)
Copelandia cyanescens (about Allen & Gartz, 1997)

Cambodia (Kampuchea)

Copelandia cambodgeniensis (Ola'h, 1969, 1970; Pollock, 1976; Weeks *et al.*,
 1979; Allen & Merlin, 1992; Ott, 1993; Stamets, 1996)
cyanescens (Heim, 1978)
C.tropicalis (Ola'h, 1969)
Psilocybe cubensis (Heim, 1958c; Allen & Merlin, 1992; Gartz, 1996; Stamets,
 1996)
Psilocybe antioquensis

China

Amanita muscaria (Needham, 1974)
Boletus sp. (Stijve, 1997)
Claviceps purpurea (Grasso, 1955; Teng, 1988)
Gymnopilus sp. (Li, 1977; Yu, 1959)
G. spectabilis (Yu, 1959)
Panaeolus papilionaceus (Li, 1977; Yu, 1959)
P. retirugis (Hongo, 1959; Teng, 1988)
Psilocybe venenata (Yu, 1959)

Hong Kong

Dictyophora indusiata (Griffiths, 1977)
Panaeolina foenisecii (Griffiths, 1977)
Panaeolus papilionaceus (Griffiths, 1977)
Pluteus salicinus (Griffiths, 1977)

India

Amanita muscaria [Wasson, 1968 (*Soma*); Cooke, 1977; Natarajan, 1977;
 Wasson *et al.*, 1986 (*Soma*); Doniger, 1990; Riedlinger, 1990; Ruck, 1990
 (these three later according to *Soma*)

- Claviceps paspali* (Grasso, 1955)
C. purpurea (Grasso, 1955; Hawksworth *et al.*, 1995)
Copelandia bispora (Natarajan & Raman, 1983)
C. cyanescens (Bose, 1920; Natarajan & Raman, 1983; Gerhardt, 1996; Ott, 1993; Gerhardt, 1996)
C. tirunelveliensis (Natarajan & Raman, 1983)
C. tropica (Natarajan & Raman, 1983)
Gymnopilus sapineus (Natarajan & Raman, 1983)
G. spectabilis (Natarajan & Raman, 1983; Ott, 1993)
-
- Hypholoma gigaspora* (Natarajan & Raman, 1983, 1985; Guzmán, 1995)
H. guzmanii (Natarajan & Raman, 1983; Guzman, 1995)
Inocybe corydalina (Sathe & Sasangam, 1977)
Panaeolina foeniseccii (Natarajan & Raman, 1983)
P. microsperma (Natarajan & Raman, 1983)
Panaeolus africanus (Natarajan & Raman, 1983)
P. ater (Ola'h, 1968, 1969, 1970)
P. papilionaceus (Bhide *et al.*, 1987)
P. sphinctrinus (Ola'h, 1969; Natarajan & Raman, 1983)
P. subbalteatus (Ola'h, 1969; Natarajan & Raman, 1983)
P. venezolanus (Gerhardt, 1996)
Psilocybe cubensis (Wasson, 1982; Natarajan & Raman, 1983; Wasson *et al.*, 1986?; Stamets, 1996)
P. goniospora (Pegler, 1977)
P. indica (Sathe & Daniel, 1980; Guzmán, 1995)
P. natarajanii (Natarajan & Raman, 1983, 1985; Guzmán, 1995)
P. pseudoaztecorum (Natarajan & Raman, 1983, 1985; Guzmán, 1995)
P. semilanceata (Bhide *et al.*, 1987; Stamets, 1996)

Indonesia (included Java; see also Borneo and Malaysia)

- Copelandia cyanescens* (Wasson, 1959a; Heim, 1960, 1978; Emboden, 1972; Pollock, 1976; Allen & Merlin, 1992a; Ott, 1993; Gerhardt, 1996)
Panaeolina rhombisperma (Horak, 1980)
Panaeolus ater (Pollock, 1976; Stijve, 1995)
Psilocybe subaeruginascens var. *subaeruginascens* (Java: Singer & Smith, 1958; Koike *et al.*, 1981; Guzmán, 1983)

Iran

- Amanita muscaria?* (Wasson, 1967; Samorini, 1993)
-
- Panaeolus papilionaceus* (Gerhard, 1996)

Israel

- Amanita pantherina* (Binyamini, 1975)
Gymnopilus spectabilis (Reichert & Avizahar, 1959; Dennis, 1986)
Inocybe tricolor (Binyamini, 1975)

Panaeolina foeniseccii (Binyamini, 1975)
Panaeolus ater (Binyamini, 1975)
P. papilionaceus (Binyamini, 1975; Dennis, 1986)
P. sphinctrinus (Binyamini, 1975; Dennis, 1986; Treu, 1996)

Japan

Agrocybe farinacea (Hongo, 1960; Koike *et al.*, 1981; Imazeki & Hongo, 1983, 1987)
Amanita muscaria (Hongo, 1959, 1960; Takemoto *et al.*, 1964a, 1964b; Locquin-Linard, 1965a; Chilton *et al.*, 1974; Ott, 1976b, 1993; Hongo & Yokoyama, 1978; Imazeki & Hongo, 1983, 1987; Yokoyama, 1985; Imazeki *et al.*, 1988)
A. pantherina (Hongo, 1959, 1960; Chilton *et al.*, 1974; Chilton & Ott, 1976; Imazeki & Hongo, 1983; Yokoyama, 1985; Imazeki *et al.*, 1988; Ott, 1993)
Copelandia cyanescens (Hongo, 1986; Imazeki & Hongo, 1987)
C. tropicalis (Imazeki & Hongo, 1987)
Cordyceps capitata (Heim & Wasson, 1958; Schultes & Hofmann, 1973, 1979; Heim, 1978; Imazeki & Hongo, 1983, 1987; Imazeki *et al.*, 1988)
C. ophioglossoides (Heim & Wasson, 1958; Schultes & Hofmann, 1973, 1979; Heim, 1978; Imazeki & Hongo, 1983, 1987; Imazeki *et al.*, 1988)
Dictyophora indusiata (Imazeki & Hongo, 1983, 1987; Yokoyama, 1985; Imazeki *et al.*, 1988)
Gerronema fibula (Hongo, 1959, 1974; Imazeki & Hongo, 1987; Imazeki *et al.*, 1988)

Gymnopilus aeruginosus (Hongo, 1959; Koeike *et al.*, 1981; Imazeki & Hongo, 1983, 1987; Imazeki *et al.*, 1988; Stamets, 1996)
G. liquiritiae (Hongo, 1959; Koeike *et al.*, 1981; Imazeki & Hongo, 1983, 1987; Imazeki *et al.*, 1988; Guzmán-Dávalos & Guzmán, 1995)
G. spectabilis (Hongo, 1959, 1960; Ott, 1976b, 1993; Walters, 1965; Koike *et al.*, 1981; Imazeki & Hongo, 1983, 1987; Yokoyama, 1985; Imazeki *et al.*, 1988; Samorini, 1993; Tanaka *et al.*, 1993; Stijve, 1995; Gartz, 1996)
Panaeolina foeniseccii (Hongo, 1959, 1986; Dennis, 1986)
P. rhombisperma (Hongo, 1973a, 1978; Horak, 1980; Gerhardt, 1996)
P. sagarae (Hongo, 1977b, 1978a)
Panaeolus ater (Ola'h, 1968)

P. fimicola (Hongo, 1959, 1960, 1986; Imazeki & Hongo, 1983; Dennis, 1986)
P. papilionaceus (Kawamura, 1918; Hongo, 1959, 1960; Pollock, 1976; Yokoyama, 1985; Hongo, 1986; Imazeki *et al.*, 1987, 1988; Gartz, 1996)
P. retirugis (Kawamura, 1918; Hongo, 1959, 1960)
P. sphinctrinus (Kawamura, 1918; Hongo, 1959, 1986; Yokoyama, 1985; Dennis, 1986; Imazeki & Hongo, 1987; Imazeki *et al.*, 1988; Treu, 1996)
P. subbalteatus (Hongo, 1959, 1960, 1976, 1986; Yokoyama, 1985; Dennis, 1986; Imazeki *et al.*, 1987, 1988; Pollock, 1976)
Pluteus atricapillus (Imazeki *et al.*, 1988)

- P. salicinus* (Hongo, 1959; Imazeki & Hongo, 1983; Dennis, 1986)
Psilocybe argentipes (Yokoyama, 1976, 1985; Koike *et al.*, 1981; Guzmán, 1983; Singer, 1986, page 568; Imazeki *et al.*, 1988; Gartz, 1996; Stamets, 1996)
P. septentrionalis var. *septentrionalis* (Guzmán, 1983, 1995)
P. subaeruginascens var. *subaeruginascens* (Koike *et al.*, 1981; Guzmán, 1983; Imazeki *et al.*, 1988; Stamets, 1996)
P. subcaerulipes (Hongo, 1959, 1960; Yokoyama, 1973; Guzmán, 1983; Ott, 1993; Gartz, 1996; Stamets, 1996)
-
- P. venenata* (Imai, 1932; Heim, 1956b, 1978; Hongo, 1957, 1959, 1960; Singer & Smith, 1958; Matsuda, 1960; Guzmán, 1983; Singer, 1986, page 568; Imazeki *et al.*, 1988; Ott, 1993; Stamets, 1996; Gartz, 1996)

Java (see Indonesia)

Korea

- Gymnopilus spectabilis* (Dennis, 1986)
Panaeolus fimicola (Lee & Hong, 1985; Dennis, 1986)
P. papilionaceus (Lee & Hong, 1985; Dennis, 1986)
P. sphinctrinus (Lee & Hong, 1985)

Kuwait

- Panaeolus papilionaceus* (Gerhardt, 1996)

Malaysia (see also Singapore)

- Boletus flammeus* (Corner, 1972)
B. nigroviolaceus (Corner, 1972)
Copelandia cyanescens (from a 1998 collection by Allen, at Alor Selar, in Kuala Lumpur Region)
Gerronema fibula (Corner, 1994)
Psilocybe cubensis (from a 1998 collection by Allen, at Alor Selar, in Kuala Lumpur Region)

Mongolia

- Panaeolus fimicola* (Gerhardt, 1996)

Nepal

- Psilocybe cubensis* ? (Schroeder & Guzmán, 1981; Gartz, 1996)
P. subcubensis ? (Schroeder & Guzmán, 1981; Gartz, 1996)

New Guinea

- Boletus* sp. (Guellert *et al.*, 1973; Southcott, 1974)
B. flammeus (Corner, 1972; Heim, 1966, 1978; Ott, 1993, stated that this species is not neurotropic)

- B. kumaeus* (Heim & Wasson, 1958, 1965; Heim, 1963, 1967, 1978; Schultes & Hofmann, 1979; Ott, 1993, stated that this species is not neurotropic)
- B. manicus* (Heim & Wasson, 1958, 1965; Heim, 1963, 1965, 1967, 1978; Corner, 1972; Schultes & Hofmann, 1979; Ott, 1993)
- B. nigerimus* (Heim and Wasson, 1965; Corner, 1972; Heim, 1963, 1978)
- B. nigroviolaceus* (Heim & Wasson, 1958, 1965; Heim, 1963, 1967, 1978; Corner, 1972; Hongo, 1973b; Schultes & Hofmann, 1979; Ott, 1993, stated that this species is not neurotropic)
- B. reayi* (Heim & Wasson, 1958, 1965; Heim, 1963, 1967, 1978; Corner, 1972; Schultes & Hofmann, 1979; Ott, 1993, stated that this species is not neurotropic)
- Copelandia affinis* (Horak, 1980; Gerhardt, 1996)
- C. lentispora* (Gerhardt, 1996)
- Gerronema fibula* (Hongo, 1974; Corner, 1994)
- Heimiella anguiformis* (Heim & Wasson, 1958, 1965; Heim 1963, 1967, 1978; Schultes & Hofmann, 1979; Ott, 1993 doubts that this species is neurotropic)
- H. retispora* (Heim & Wasson, 1958, 1965; Heim, 1963, 1967; Schultes & Hofmann, 1979)
- Panaeolus rubricaulis* (Yokoyama, 1979; Gerhardt, 1996)
- P. subbalteatus* (Hongo, 1976; Dennis, 1986)
- Psilocybe brunneocystidiata* (Guzman, 1983)
- P. incospicua* (Guzmán, 1983)
- P. kumaenorum* (Heim *et al.*, 1967; Heim, 1978; Guzmán, 1983; Ott, 1993)
- P. papuana* (Guzmán, 1983)
-
- Russula agglutina* (Heim & Wasson, 1958; Heim, 1963, 1967, 1978; Schultes & Hofmann, 1979; Ott, 1993, wrote that there is no scientific evidence that this species is neurotropic)
- R. kirinea* (Heim & Wasson, 1958; Heim, 1963, 1967, 1978; Schultes & Hofmann, 1979; Ott, 1993, wrote that there is no scientific evidence that this species is neurotropic)
- R. maenadum* (Heim & Wasson, 1958; Heim, 1963, 1967, 1978; Schultes & Hofmann, 1979; Ott, 1993, wrote that there is no scientific evidence that this is neurotropic)
- R. nondorbingi* (Singer *et al.*, 1958; Heim & Wasson, 1958, 1965; Singer, 1958, 1960a; Heim, 1963, 1967, 1978; Rumack & Salzman, 1978; Schultes & Hofmann, 1979; Ott, 1993, wrote that there is no scientific evidence that this species is neurotropic)
- R. pseudomaendum* (Heim & Wasson, 1958; Heim, 1963, 1967, 1978; Schultes & Hofmann, 1979; Ott, 1993, wrote that there is no scientific evidence that this species is neurotropic)
- R. wahgiensis* (Singer *et al.*, 1958; Singer, 1960a)

Philippines

Claviceps purpurea ? (Grasso, 1955)
Copelandia cyanescens (Singer, 1960; Ola'h, 1969; Heim, 1978; Pollock, 1976; Weeks *et al.*, 1979; Stamets, 1996)
C. tropicalis (Ola'h, 1970; Weeks *et al.*, 1979)
Panaeolus papilionaceus (Graff, 1922)
P. sphinctrinus (Ola'h, 1969)
P. subbalteatus (Ola'h, 1969)
Psilocybe cubensis (Wasson, 1958)

Russia (Siberia) (see in Europe)

Singapore (south of Malaysia)

Boletus flammeus (Corner, 1972)
B. nigerrimus (Corner, 1972)
B. nigroviolaceus (Corner, 1972)

Sri Lanka (Ceylon)

Copelandia cyanescens (Coomarasway, 1979; Singer, 1960a, 1969; Heim *et al.*, 1966; Pollock, 1976; Pegler, 1986)
C. cambodgeniensis (Gerhardt, 1996)
Panaeolus ater (Ola'h, 1969)
P. papilionaceus (Coomarasway, 1979)
P. rubricaulis (Gerhardt, 1996)
Psilocybe goniospora (Pegler, 1986; Guzmán, 1983, 1995)
P. ochreatea (Guzmán, 1983; Pegler, 1986)
P. rostrata (Pegler, 1986; Guzmán, 1995)

Sumatra (see Indonesia)

Amanita pantherina (Watling, pers. comm.)
Copelandia cyanescens (Allen & Gartz, 1997)

Thailand

Copelandia cyanescens (Heim, 1978; Allen & Merlin, 1992; Stijve, 1992, 1995; Ott, 1993; Gerhardt, 1996)
Psilocybe cubensis (Heim, 1958c; Allen & Merlin, 1992; Mckenna, 1993; Ott, 1993; Stijve, 1995; Hobbs, 1995; Stamets, 1996; Gartz, 1996)
P. samuiensis (Allen & Merlin, 1992; Gartz *et al.*, 1994; Guzmán *et al.*, 1993a; Gartz, 1996; Stamets, 1996)
P. subcubensis (Guzmán, 1983; Allen & Merlin, 1992; Ott, 1993; Stijve, 1995)

Turkey

Claviceps paspalo (Grasso, 1955)
C. purpurea (Grasso, 1955)

Viet-Nam

Panaeolus rubricaulis (Gerhardt, 1996)
Psilocybe cubensis (Heim, 1956a, 1958a; Singer & Smith, 1958; Heim & Wasson, 1958; Chilton, 1978; Guzmán, 1983; Stamets, 1996; Allen & Gartz, 1997)

AUSTRALASIA**Widely distributed**

Claviceps paspali (Mantle, 1977)

Australia

Amanita muscaria (Hongo, 1959; Cleland, 1976; Southcott, 1974; Hongo & Yokoyama, 1978; Allen *et al.*, 1991)
Claviceps paspali (Grasso, 1955; Cooke, 1977)
C. purpurea (Grasso, 1955)
Copelandia cyanescens (Pollock, 1976; Southcott, 1974; Allen *et al.*, 1991; Stijve, 1992; Gerhardt, 1996; Gartz, 1996)
Gerronema fibula (Hongo, 1959, 1974)
Gymnopilus spectabilis (Hongo, 1959; Dickinson & Lucas, 1983; Allen *et al.*, 1991)
G. purpuratus (Allen *et al.*, 1991; Stamets, 1996)
Panaeolina foenicisecii (Hongo, 1959; Southcott, 1974; Cleland, 1976; Dennis, 1986; Gerhardt, 1996)
Panaeolus ater (Young, 1989)
P. fimicola (Hongo, 1959)
P. olivaceus (Gerhardt, 1996)

P. papilionaceus (Hongo, 1959; Southcott, 1974; Gerhardt, 1996)
P. retirugis (Hongo, 1959)
P. sphinctrinus (Hongo, 1959)
P. subbalteatus (Hall, 1973)
Psilocybe australiana (Margot & Watling, 1981; Guzmán, 1983; Chang & Mills, 1992; Stamets, 1996)
P. collybioides (Hall, 1973; Southcott, 1974) (about Guzmán, 1983, this is not the same species as reported by Singer & Smith, 1958, from Argentina) (*P. collybioides* is a synonym of *P. zapotecorum*)
P. cubensis (Hall, 1973; Southcott 1974; Margot & Watling, 1981; Guzmán, 1995; Gartz, 1996; Stamets, 1996)
P. cyanescens (Margot & Watling, 1981; Guzmán, 1995)
P. eucalypta (Margot & Watling, 1981; Guzmán, 1983; Chang & Mills, 1992)
P. semilanceata (Margot & Watling, 1981; Dickinson & Lucas, 1983; Redhead, 1989; Allen *et al.*, 1991; Guzmán, 1995; Stamets, 1996)
P. subaeruginosa (Picker & Richards, 1970; Hall, 1973; Southcott, 1974; Cleland, 1976; Chilton, 1978; Margot & Watling, 1981; Guzmán, 1983; Chang & Mills, 1992; Johnston & Buchanan, 1995; Gartz, 1996)

P. subcubensis (Margot & Watling, 1981; Guzmán, 1983, 1995)

P. tasmaniana (Stamets, 1996)

Tasmania

Copelandia cyanescens (Allen *et al.*, 1991)

Psilocybe australiana (Guzmán, 1983; Chang & Mills, 1992; Stamets, 1996)

P. cubensis (Guzmán, 1983)

P. semilanceata (Guzmán, 1983, 1995; Allen *et al.*, 1991; Chang & Mills, 1992; Samorini, 1993; Stamets, 1996)

P. subaeruginosa (Picker & Rickards, 1970; Southcott, 1974; Guzmán, 1983;

Chang & Mills, 1992; Johnston & Buchanan, 1995; Stamets, 1996)

P. tasmaniana (Guzmán, 1983; Chang & Mills, 1992; Stamets, 1996)

New Zealand

Amanita muscaria (Hongo & Yokoyama, 1978; Allen *et al.*, 1991)

Claviceps paspali (Grasso, 1955)

C. purpurea (Grasso, 1955)

Copelandia cyanescens (Allen *et al.*, 1991)

Gymnopilus purpuratus (Allen *et al.*, 1991)

G. spectabilis (Allen *et al.*, 1991)

Panaeolina foenisecii (Allen *et al.*, 1991)

Panaeolus subbalteatus (Allen *et al.*, 1991)

Psilocybe aucklandii (Guzmán *et al.*, 1991, 1993b; Johnston & Buchanan, 1995; Stamets, 1996)

P. australiana (Allen *et al.*, 1991; Guzmán *et al.*, 1993b; Guzmán, 1995)

P. collybioides (Allen *et al.*, 1991) (see note in *P. collybioides* from Australia)

P. eucalypta (Guzmán *et al.*, 1993b; Allen *et al.*, 1991)

P. kumaenorum (Allen *et al.*, 1991)

P. makarorae (Johnston & Buchanan, 1995; Stamets, 1996)

P. semilanceata (Allen *et al.*, 1991; Guzmán *et al.*, 1993b; Stamets, 1996)

P. subaeruginosa (Allen *et al.*, 1991; Johnston & Buchanan, 1995)

P. subcubensis (Allen *et al.*, 1991)

P. tasmaniana (Allen *et al.*, 1991; Chang & Mills, 1992; Stamets, 1996)

OCEANIA

Bononi Islands

Copelandia tropicalis (Hongo, 1977a)

Fiji

Copelandia cyanescens (Ola'h, 1969)

Psilocybe cubensis (Wasson, 1959b)

Hawaii

Amanita muscaria (Merlin & Allen, 1993; Allen, 1998)

Claviceps paspali (Grasso, 1955)

Copelandia anomala (Pollock, 1976; Stijve, 1992; Merlin & Allen, 1993; Allen, 1998)

C. bispora (Merlin & Allen, 1993; Allen, 1998)

C. cambodginiensis (Ola'h, 1968, 1970; Weeks *et al.*, 1979; Merlin & Allen, 1993; Ott, 1993; Gerhardt 1996; Stamets, 1996; Allen, 1998)

C. cyanescens (Heim *et al.*, 1966; Pollock, 1976; Stamets, 1978; Stijve, 1992, 1995; Stijve & Meijer, 1993; Merlin & Allen, 1993; Ott, 1993; Stijve & Blake, 1994?; Gerhardt, 1996; Gartz, 1996; Allen, 1998)

C. tropicalis (Ola'h, 1968, 1970; Stamets, 1978, 1996; Weeks *et al.*, 1979; Merlin & Allen, 1993; Ott, 1993; Allen, 1998)

Panaeolus subbalteatus (Beug & Bigwood, 1982; Stijve & Kuyper, 1985; Gartz, 1989b; Merlin & Allen, 1993; Gartz, 1996; Stamets, 1996; Allen, 1998)

P. sphinctrinus (Allen, 1998)

New Caledonia

Hypholoma neocaledonica (Guzmán, 1979, 1980, 1983)

Solomon Islands

Gerronema fibula (Corner, 1994)

Samoa

Copelandia cyanescens (Cox, 1981; Gartz, 1996)

ANTARTIC (Macquarie Is.)

Panaeolus mollearinus (Singer, 1960a)

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LEGEND OF THE FIGURES

Figs. 1-18. Some important neurotropic fungi. 1: *Cordyceps capitata* growing on a *Elaphomyces*. 2: *Claviceps purpurea* (several sclerotia on a tassel of rye). 3: *Pluteus atricapillus*. 4: *Copelandia cyanescens*. 5: *Psilocybe laurae*. 6: *Psilocybe hoogshagenii* var. *convexa*. 7: *Psilocybe cubensis*. 8: *Hypholoma naematoliformis*. 9: *Psilocybe plutonia*. 10: *Psilocybe galindoi*. 11: *Psilocybe mexicana*. 12: *Gymnopilus spectabilis*. 13: *Panaeolus sphinctrinus*. 14: *Psilocybe semilanceata*. 15: *Psilocybe angustipleurocystidiata*. 16: *Psilocybe hoogshagenii* var. *hoogshagenii*. 17: *Psilocybe meridiensis*. 18: *Amanita muscaria* (they are not at scale) (drawing by G. Guzmán).

Fig. 19. Distribution (localities) of the neurotropic species of *Psilocybe* through the world. Note the high concentration of localities in both NW and NE of U.S.A., Mexico, Caribbe, South America, Europe, India, Japan, New Guinea, eastern Australia and New Guinea.

Figs. 20-25.- 20: *Pluteus salicinus* (photo T. Stijve). 21: *Psilocybe bohemica* (photo J. Gartz) 22: *Psilocybe caerulipes* (photo A.H. Smith). 23: *Psilocybe aucklandii* (photo C. King). 24: *Psilocybe aztecorum* var. *aztecorum* (photo G. Guzmán). 25: *Psilocybe armandii* (in culture, photo S.H. Pollock).

Figs. 26-29.- 26: *Psilocybe brasiliensis* (photo G. Guzmán). 27: *P. columbiana* (photo G. Guzmán). 28: *P. mexicana* (photo G. Guzmán). 29: *P. pelliculosa* (photo A.H. Smith).

Figs. 30-33.- 30: *Psilocybe ramulosum* (photo G. Guzmán). 31: *P. serbica* (photo R. Singer). 32: *P. sanctorum* (photo G. Guzmán). 33: *P. baeocystis* (photo G. Guzmán).

Figs. 34-39.- 34: *Psilocybe caerulescens* var. *caerulescens* (photo G. Guzmán). 35: *P. singerii* (photo G. Guzmán). 36: *Psilocybe natalensis* (photo J. Gartz). 37: *Inocybe aeruginascens* (photo J. Gartz). 38: *Inocybe haemacta* (photo T. Stijve). 39: *Gymnopilus purpuratus* (photo J. Gartz). 40: *Galerina steglichii* (photo H. Besl). 41: *Psilocybe samuiensis* (photo J. W. Allen).