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

Abstract - GASTÓN GUZMÁN, JOHN W. ALLEN & JOCHEN GARTZ - A worldwide geographical distribution of the neurotropic fungi, an analysis and discussion.

In this paper, the world distribution of 216 known species of neurotropic fungi is discussed. The neurotropic fungi considered are divided into the following four groups: 1) species with psilocybin and related indoles, or those likely to contain these substances, 2) species with ibotenic acid, 3) ergot fungi, and 4) species used as sacred fungi for which no reliable chemical studies have been found. In the first group are *Psilocybe* (116 species), *Gymnopilus* (14 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 known chemical studies. In the second group are *Amanita muscaria*, *A. pantherina* and *A. regalis*; in the third group are *Claviceps purpurea* and allies: 5 species of *Claviceps* and 2 of *Cordyceps*; in the fourth group are bolets (two genera with 8 species), *Russula* (6 species), and 6 species of gasteromycetes (Lycoperdales y Phallales) in 3 genera. Concerning the distribution of *Psilocybe*, the majority of the species are found in or near the Austral hemisphere, mainly in the subtropical humid forests. Within these forests reside the most well documented ethnic groups that use neurotropic fungi, such as the native peoples of 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.

Keywords: Neurotropic fungi, Check list, Distribution

Riassunto - GASTÓN GUZMÁN, JOHN W. ALLEN & JOCHEN GARTZ - Distribuzione mondiale dei funghi psicotropi: analisi e discussione.

Nel presente articolo viene discussa la distribuzione mondiale delle 216 specie sinora note di funghi psicotropi. Questi funghi sono suddivisi in quattro gruppi: 1) specie contenenti psilocibina e affini composti indolici, o probabilmente contenenti questi composti; 2) specie contenenti acido ibotenic; 3) specie di ergot; 4) specie usate come funghi sacri per le quali non sono

disponibili studi chimici certi. Al primo gruppo appartengono membri dei generi *Psilocybe* (116 specie), *Gymnopilus* (14), *Panaeolus* (13), *Copelandia* (12), *Hypholoma* (6), *Gerronema* (2) e *Agrocybe*, *Galerina* e *Mycena* (ciascuna con una specie), sebbene per numerose specie di questo gruppo, principalmente funghi Panaeoloidei, non siano noti studi chimici. Al secondo gruppo appartengono *Amanita muscaria*, *A. pantherina* e *A. regalis*; al terzo gruppo appartengono *Claviceps purpurea* e specie affini: 5 specie di *Claviceps* e 2 di *Cordyceps*; nel quarto gruppo rientrano boleti (due generi con 8 specie), 6 specie di *Russula* e 6 specie di *Gasteromycetes* (*Lycoperdales* e *Phallales*) distribuite in 3 generi. Riguardo alla distribuzione delle *Psilocybe*, la maggior parte delle specie si trova nel o vicino all'emisfero Australe, principalmente nelle foreste umide subtropicali. All'interno di queste foreste risiedono i gruppi etnici più importanti che usano i funghi psicotropi, quali le popolazioni native del Messico e della Nuova Guinea. Il Messico possiede il numero più elevato di specie neurotropicche di funghi, con 76 specie, delle quali 44 appartengono al genere *Psilocybe* (39% delle specie nel mondo). Vengono considerati più di 450 riferimenti bibliografici.

Parole chiave: Funghi psicotropi, Check list, Distribuzione

INTRODUCTION

The fungi with neurotropic (hallucinogenic or psychotropic) properties, also referred to as hallucinogenic, narcotic, magic, sacred, psychedelic or entheogenic mushrooms, are highly diverse and have a wide distribution throughout the world. During the past 40 years, since the rediscovery of the traditional use of hallucinogenic fungi in Mexico among several groups of indigenous peoples native to the central or southern regions of the country, numerous species of neurotropic mushrooms have been identified (Guzmán, 1959, 1977a, 1978b, 1982, 1983, 1990a, b). They were first studied by Schultes (1939), Singer (1949, 1958, 1959, 1960a), Singer and Smith (1958), Heim (1956a, b, 1957a, c, 1958a, b), Wasson and Wasson (1957), Heim & Wasson (1958) and Wasson (1959a, b, 1962, 1980). 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 «teotlaquilnánacatl» (which translate to: kid or little boy, mayor or leader, fungus of the genius, that eruptions thing, and divine fungus, 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 names most commonly used to describe *Psilocybe cubensis* ⁽¹⁾, *P. mexicana* and *P. zapotecorum*, respectively

(¹) For the authors, synonyms and classification of the species see Table I, except for species not considered there.

(Guzmán, 1959, 1983, 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 the following two important time periods: 1) before Wasson, Heim and Singer's studies on the hallucinogenic fungi, which had been 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 played such an important role toward the study of other fungi, that they produced interest in other specialists to study all of the fungi in the country.

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 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 and Koryak peoples, as were the psilocybian fungi important between the Indians in Mexico. Later, Singer (1958, 1960a), Heim and Wasson (1965) and Heim (1965a, 1978) reported the use of *Psilocybe*, *Russula* and Boletaceous fungi as sacred mushrooms among several aborigines in New Guinea.

The criteria used to define the various neurotropic fungi are often confusing according to the mycologists. For example, Oldridge *et al.* (1989) considered some polypores known to contain hordenine, N-methyltyramine 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) and 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, such 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, por-

traying a Christ with a sun and moon on each side of him. However, there is no evidence of neurotropic properties related to the use of this fungus, its use in the cult is probably in relationship with the use of neurotropic species of *Psilocybe*, used in this region where active species of this genera are commonly found.

Ott (1993) presented a list of fungi species containing psilocybin based on 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). For each of the species of interest in these genera, Ott presented the bibliographic references about related studies, notes, as well as problems or contradictions, such as those in *Gerronema*, *Hygrocybe* and *Inocybe*, according to the work of Gartz (1986e). In those bolets reported by Heim (1963, 1966, 1978) as hallucinogenic in New Guinea, Ott (1993) stated that they do not possess any neurotropic properties. *Phellinus igniarius* (Fr.) Quél. and *Fomes fomentarius* were observed in Alaska as narcotic fungi. In *Gymnopilus*, there is a interesting study on *G. penetrans* (Fr.: Fr.) Murrill (Dangy-Cave & Arpin, 1974), although apparently independent of the neurotropic fungi.

Hatfield (1979) reported that ibotenic acid was present in *Amanita pantherina* and *A. cothurnata*, in spite of the reports of intoxication induced by these fungi in central Europe. Adewusi *et al.* (1993) considered *Chlorophyllum molybdites* (Meyer: Fr.) Masee from Africa with to have 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» (meaning: «eat and hear voices from heaven»); however, many reports (Lincoff, 1981; Guzmán, 1977a; Portugal *et al.*, 1992; Duffy and Vergeer, 1977) on this fungus considered it to be a poisonous mushroom species. Pegler (1977, 1983) commented that there is a considerable amount of confusion about whether 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, Phillipins and East Africa. However, Heim (1978) considered *Ch. molybdites* as an edible fungus in Africa. *Schizophyllum commune* was reported as a hallucinogenic fungus in Australia (Southcott, 1974); yet 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» (meaning: «little bird»), a name also used for *Psilocybe mexicana*, but without any relationship between them with respect to 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 North American Indians peoples. 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, such as *Lycoperdon perlatum* Pers., forming fairy rings in grasslands. Although none of these species have neurotropic properties, they are, on the contrary, edible. However, Heim and Wasson (1962) and Heim *et al.* (1967) reported the use of *Lycoperdon mixtecorum* and *L. marginatum* (synonyms of *Vascellum qudenii* and *Lycoperdon candidum*, respectively [following 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 (1962) 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 manner suggesting the confusion of these species with more traditional neurotropic fungi among some Indians for religious or magical purposes. 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., reported that the Indians used them indistinctly as a narcotic fungi, along with *Scleroderma verrucosum* Pers., which was experimentally proven to be poisonous. Chemical analysis of these fungi (except in *S. verrucosum*) confirmed the presence of psilocybin. The conclusions of Ott *et al.* (1975) were that the Mixtec narcotic puffballs were a mixture of 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 between the Indians and are listed in the bibliography (e.g. Schultes, 1976). Another example with similar discrepancies among various authors and their resulting conclusions is *Dictyophora indusiata*, with its three forms (Guzmán *et al.*, 1990) (see Table I), all of which are used as special «narcotic» fungi for divination purposes among the Chinantec Indians in Oaxaca, Mexico (Heim and Wasson, 1958; Wasson, 1959a; Guzmán, 1997).

Recently, chemical studies on species of neurotropic fungi show the presence of psilocybin, related compounds mistaken for psilocybin, or indole metabolites in several fungi (Becker *et al.*, 1988; Besl, 1994; Chilton, 1978; Christiansen *et al.*, 1984; Gartz, 1985a, b, c, 1986a, b, d, 1987a, c, 1989a, b, c, e, 1991a, b, 1995a; Gurevich, 1993; Koike *et al.*, 1981; Kreisel and Lindequist, 1988; Semerdzieva *et al.*, 1986; Singer, 1978; Stijve, 1987; Stijve and Bonnard, 1986; Stijve *et al.*, 1985 and Takemoto *et al.*, 1964a, b, c). However, several studies must be considered doubtful due to errors in 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.) Kuyp., *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 foenisecii* and *Rickenella straminea* (Petch) Pegler. Frequently, a single species has been reported with and without neurotropic substances according to different researchers. An example is *Panaeolina foenisecii*, 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. Robbers *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. foenisecii* is a toxic fungus, more so than neurotropic, as is with the majority of the Panaeolodeous fungi. 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 to date, but *C. cyanopus* and *C. smithii* were shown to contain psilocybin (Benedict *et al.*, 1967) (Mantle and Waight, 1969, wrote erroneously that Benedict *et al.*, 1967, reported *C. siligineoides* contained psilocybin). It is important to observe that *C. siligineoides* was collected only one time in 1955 by Wasson in the State of Oaxaca, Mexico, and there have been no additional reports of this species being found since. Even after several years of extensive field-work in Mexico, Guzmán has been unable to re-collect this fungus (Guzmán, 1997).

The problem of mis-identification is yet another factor contributing to the confusion concerning published chemical studies of neurotropic fungi. Unfortunately, it is frequently found that many chemical studies do not have a taxonomic base, in some cases a mixture of different species were studied. Guzmán, found a mixture of *Panaeolus* spp. and *Psilocybe mexicana*, together with *P. coprophila* (Bull.: Fr.) P. Kumm., all of them identified as *P. coprophila* (in ENCB Herbarium at Mexico City), in material used by Leslie and Repke to isolate psilocybin (Guzmán, 1983). *Psilocybe pseudobullacea* (Petch) Pegler is a not bluing species (Guzmán, 1983, 1996) and no neurotropic properties have been found. However, Marcano *et al.* (1994) isolated psilocybin and psilocin from Venezuelan specimens; it is probable that the Venezuelan material belongs to a neurotropic species that has yet to be determined as such. Høiland (1978) reported psilocybin in *P. atrobrunnea*. It is probable that Høiland's fungus is a species

with similar appearance, such as *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 is an important variable which needs to be taken into consideration. Repke *et al.* (1977a) showed variations in the presence of baecocystin according to the age of the studied materials, e.g., in *Psilocybe baecocystis* and *P. cyanescens* have no trace 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 slightly neurotropic or entirely inactive 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 found 0.014, 0.67, and 0.84 % dry wt. in specimens from 1869, 1954 and 1976, respectively. It seems that psilocybin and psilocin are volatiles, as Guzmán observed while exploring Oaxaca (Mexico) looking for neurotropic fungi in 1958. He experienced 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 semifermented neurotropic specimens of a mixture of *Psilocybe* spp. (*P. caerulescens*, *P. cordispora*, *P. cubensis*, *P. mexicana* and *P. zapotecorum*), that he had gathered with the help of local Indians. These mushrooms were kept in sacs and had been collected for commercial purposes. The air of the room was heavy with a strong acrid aroma of the fungi to which his prolonged exposure resulted in the hallucinations that he experienced. When he came out of the room to breathe fresh air, the hallucinations stopped. In another case, the age of the fungi surely accounts for the reason why Hofmann (in Heim and Wasson, 1958) did not find any indoles present 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. 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 closely related taxonomically to *Claviceps purpurea*, the famous ergot that produces certain types of hallucinations (Ramsbottom, 1954; Schultes & Hofmann, 1973, 1979; Wasson *et al.*, 1978). These species of *Cordyceps* are used in Mexico in special nocturnal ceremonies, where they are eaten either with *Psilocybe muliercula* or alone. In the center of the room where the ceremony is performed, a specimen of *Elaphomyces* (e.g. *E. granulatus* Fr.,

E. muricatus Fr. or *E. reticulatus* Vitt.), the host of those *Cordyceps*, is placed 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 of the wounds or to «rejuvenecerel organismo» (rejuvenate the organism) (Trappe *et al.* 1979; Guzmán, 1994a, b).

The history of the neurotropic fungi, as Stamets (1978, 1996) suggested, can be divided into four historical periods. But presently we are 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, among the most important; 2) uncertain or erroneous studies about the identification of such fungi in the begining of the present century (Schultes, 1939, stated that the neurotropic fungi in Mexico belong only to *Panaeolus campanulatus* var. *sphinctrinus*, a position 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 recreational drug, forced the goverments of many countries, to forbid the use and commerce of these fungi. However, in the U.S.A., Canada, Europe and Australia, people continue using these mushrooms for recreational purposes, leading to the development of an 'underground' market and the illegal trade of these fungi. (Oldridge *et al.*, 1989; Rumack and Salzman, 1978; Southcott, 1974, and Watling and Gregory, 1987). Because of this trade, it is frequently reported that the tropical fungus *Psilocybe cubensis* is found in Europe, however, it is in the form of illegally cultivated or dried specimens imported from tropical countries.

Besides the confusion regarding the taxonomy of the neurotropic fungi, a survey of the vast treasure-chest of literature shows that their distribution is still poorly documented, 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 studied them believed that they only occurred in Mexico. However, numerous species of neurotropic fungi were found in the U.S.A., South America, Europe, Siberia, the 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). Guzmán, (1983) in his world monograph of the genus *Psilocybe*, showed a large distribution of these fungi on all of the continents, with the majority of species

occurring in Latin America. Recently Guzmán, 1998a, 1999b; 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) discovered 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 from around 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*. We don't follow Kühner and Romagnesi (1953) and Kühner (1980), which considered *Psilocybe*, *Hypholoma* and *Stropharia* (*Geophila* s. Kühner & Romagnesi, or *Psilocybe* s. Kühner) belonging to the same genus. 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 these were used instead of the countries where they belonged except with the British Islands. The bibliographical references, more than 450, in the check-list of the present paper, are based on the most important works where information on the description of the species, uses, traditions or chemical studies are supplied. The works of Bresinsky & Besl (1990), Chilton (1978), Fericgla (1994), Furst (1992), Guzmán (1997), Heim (1978), Hobbs (1995), Mckenna (1993), Ott (1976b, 1993), Schultes and Hofmann (1973, 1979), Singer, 1978; Wasson (1962, 1968, 1980) and Wasson & Wasson (1957), between others, offer important general information in the subject.

RESULTS

More than 250 species of fungi are reported as neurotropic, of which the authors consider 216 species belonging to the Ascomycotina (*Claviceps* and

Cordyceps) and Basidiomycotina (20 genera). *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, following Singer and Smith (1958), Guzmán (1983) and Singer (1986), the authors considered those species with the bluing feature or with indolic substances or species which suggest that they have such substances. In the bluing species of *Psilocybe* there are those belonging to the sections *Aztecorum*, *Brunneocystidiatae*, *Cordisporae*, *Cubensies*, *Mexicanae*, *Semilanceatae*, *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 are confusedly reported as hallucinogenic, as was discussed. *Psathyrella sepulchralis* Singer, A.H. Sm. & Guzmán was excluded because it was wrongly confused with *Psilocybe zapotecorum* (Singer *et al.*, 1958a; Guzmán, 1959, 1977a) and it does not contain psilocybin (Ott and Guzmán, 1976). *Panaeolus antillarum* (Fr.) Dennis [= *Psilocybe antillarum* (Fr.) Sacc., *Panaeolus solidipes* (Peck) Sacc., *P. phalenaarum* (Fr.) Quél., *Anellaria sepulchralis* (Berk.) Singer] is also excluded; this fungus is often erroneously identified as *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 also occurs infrequently in Europe (Bon, 1987b; Palacios and Laskibar, 1995, as *P. phalenaarum*; Gerhardt, 1996).

The neurotropic fungi in the present paper are divided in four groups: 1) those fungi with indolic substances, 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. trisporii*, 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 (6 species belonging to Lycoperdales and Phallales) (see Table I). In the Panaeoloidae fungi 29 species are considered in *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 Gerhardt (1996) that 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 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 mountain 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 that they are very common in the area (Guzmán *et al.*, 1994, 1997b). Moreover, there are not records of neurotropic fungi from several parts of the world, as the southeastern 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 not records from Korea, Malaysia (except Java and Sumatra) and Hawaii, and even fewer from Alaska and Costa Rica, between others. Even in the U.S.A., mycological researches are somewhat limited and scarces in several states, as Arizona, Colorado, Illinois, Maryland, Vermont, Massachusetts, New Hampshire and Pennsylvania, where there are not records of neurotropic species of *Psilocybe*. This is the reason that whatever we study materials collected from any region, we find new species (Gartz *et al.*, 1995; Guzmán, 1998a, b, 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 foenisecii* and almost all other species of *Panaeolus* (see Table I). *Panaeolina foenisecii* 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 only it was reported by Hongo (1986), who also considered another two species (Hongo, 1973a, b). It is surprise to see that there is not any report of this species from Central America and The Carribbean 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.*, 1966b, 1967). In Mavi, in the Hawaiian Archipelago, *C. cyanescens* grows at 3,000 alt. (Merlin & Allen, 1993). *Amanita muscaria* grows in a mycorrhizal 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, unpublished 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, 1995). 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 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 apparently northern species as *P. caerulipes*, so common in the deciduous forests of the eastern of North America, reaches the northeastern Mexico (Zacualtipan, Hidalgo) through the same type of vegetation (known as mesophytic forest in Mexico, but with *Fagus*). But southern species as *P. yungensis* and *P. subyungensis* common in South America, reached Mexico through the same mesophytic forests, but with *Alnus*. Guzmán (1975a) 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 only in tropical forests and the last is the mesophytic forests or temperate regions. In fact, in Mexico is a conjugation of both northern and southern mycobiotas, as it is observed with *Psilocybe* (Guzmán, 1998b).

In the map of Fig. 19, it shows the worldwide distribution of the neuro-

tropic 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 in Europe. In connection with the distribution of the neurotropic fungi, it seems inexact or somewhat exaggerated the world map as presented by Stamets (1996). He filled with dots all 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 (1978) 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 *Panaeolina foenisecii*; 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 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 a strong relationships with *P. baeocystis* 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 scarces mycological explorations, in contrast with the high biodiversity of that continent. There are only known 6 or 8 known neurotropic species of *Psilocybe* in Africa. Of these, *P. cubensis* seems grows in Kenya despite the confusing reports of Cullinan *et al.* (1945), followed by Charters (1957, 1958) and Vendcourt and Trump (1969). Pegler (1977) reported only *P. aquamarina* from Kenya, a close species with *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, 1970; 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 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 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 14 species of neurotropic species of *Psilocybe* are known.

TABLE I. TAXONOMY AND SYNONYMY OF THE NEUROTROPIC SPECIES OF FUNGI CONSIDERED IN THE PRESENT PAPER (2)

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 cyanorbiza* 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.:

(2) Only the most important synonyms are considered.

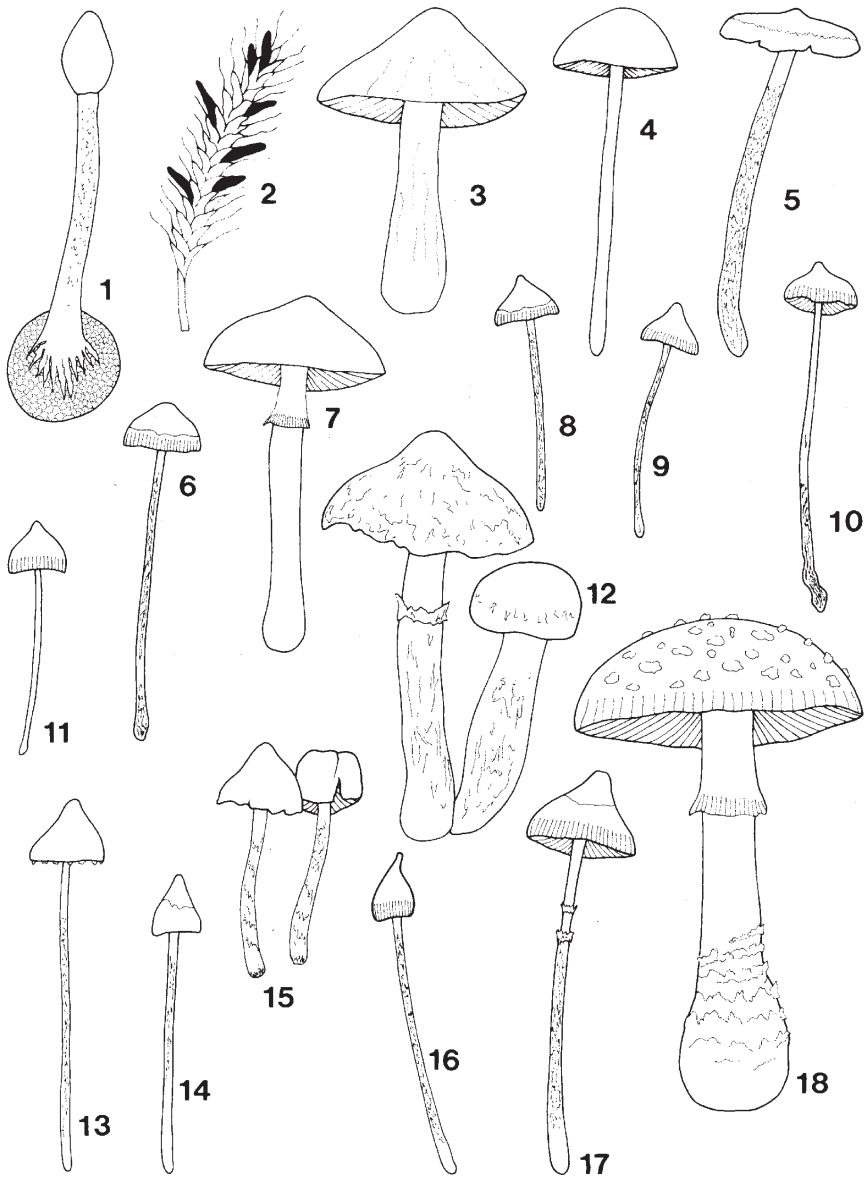
- Fr.) Bertillon, and var. *persicina* Jenkins (see Singer, 1986, Jenkins, 1977, 1986 and Castro, 1998) (Fig. 18) (see below var. *reglis* as *A. regalis*)
12. *A. pantherina* (DC.: Fr.) P. Kumm. with varieties, as var. *mutisquamosa* (Peck) Jenkins, var. *pantherinoides* (Murrill) Jenkins and var. *velatipes* (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. *bispora* 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*)
32. *Panaeolina foeniseeii* (Pers.: Fr.) Maire [= *Panaeolus foeniseeii* (Pers.: Fr.) Kühner; *Psathyrella foeniseeii* (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)
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)



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).

39. *P. fimicola* (Fr.) Gillet (see *P. ater*)
40. *P. microsporus* Ola'h & Cailleux
41. *P. moellerianus* Singer (= *P. subbalteatus* sensu Möller, 1945) (about Gerhardt, 1996, this is a nomen dub.)
42. *P. olivaceus* F.H. Möller (it has some confused synonym with *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)
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.; *Pb. 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)
60. *Psilocybe acutipilea* (Speg.) Guzmán
61. *P. angustipleurocystidiata* Guzmán (Fig. 15)
62. *P. antioquensis* 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. 2)
75. *P. brasiliensis* Guzmán (Fig. 26)
76. *P. brunneocystidiata* Guzmán & Horak

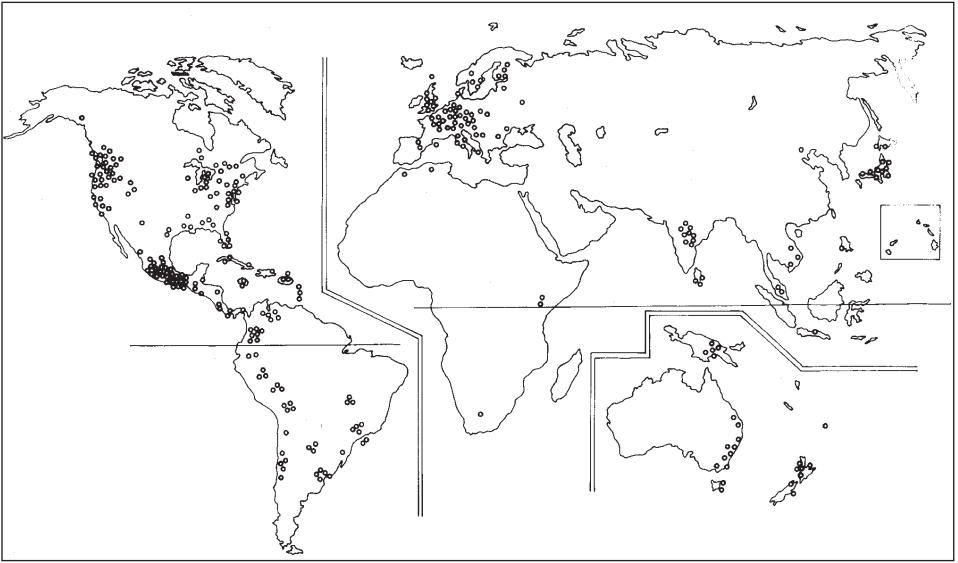


Fig. 19 - Distribution (localities) of the neurotropic species of *Psilocybe* through the world. Note the high concentration of localities in both NW and NE of U.S.A., Mexico, Caribbe, South America, Europe, India, Japan, New Guinea, eastern Australia and New Guinea.

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. caesiannulata* 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

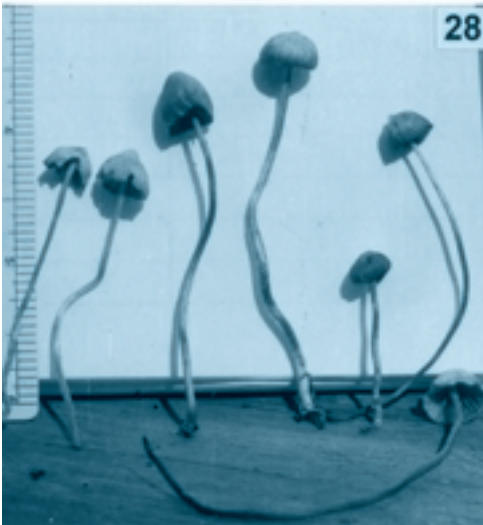


Figs. 20-25 - 20: *Pluteus salicinus* (photo T. Stijve). 21: *Psilocybe bohémica* (photo J. Gartz) 22: *Psilocybe caerulipes* (photo A.H. Smith). 23: *Psilocybe aucklandii* (photo C. King). 24: *Psilocybe aztecorum* var. *aztecorum* (photo G. Guzmán). 25: *Psilocybe armandii* (in culture, photo S.H.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

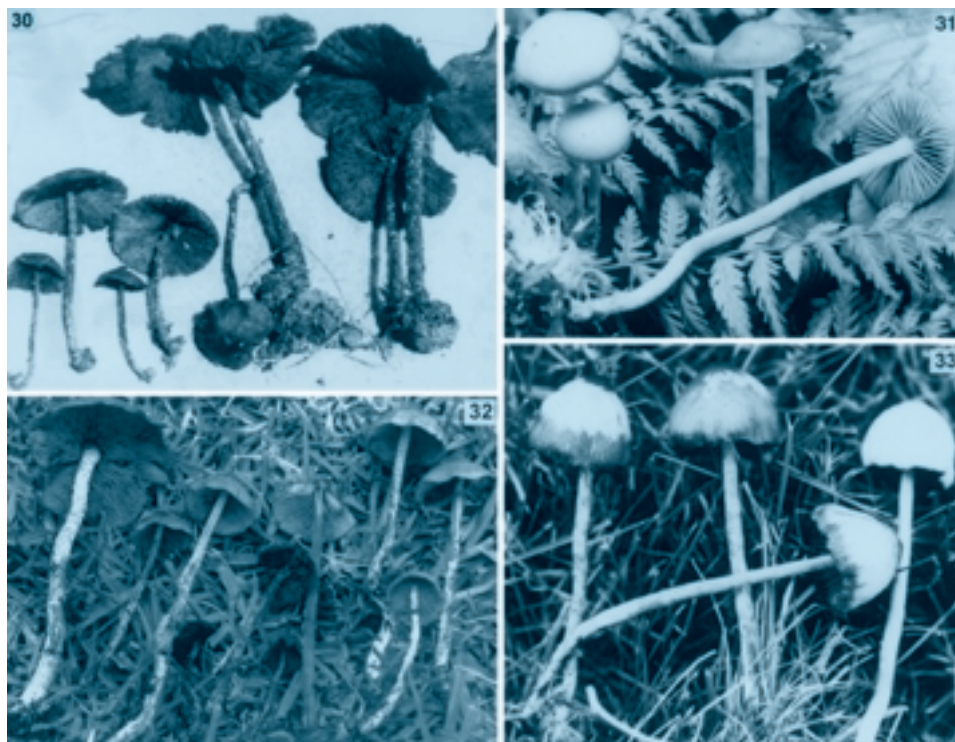
140. *P. ramulosa* (Guzmán & Bononi) Guzmán (= *P. zapotecorum* var. *ramulosum* Guzmán & Bononi) (Fig. 30)
141. *P. rostrata* (Petch) Pegler
142. *P. rzedowskii* Guzmán
143. *P. samuiensis* Guzmán, Bandala & Allen
144. *P. sanctorum* Guzmán (Fig. 32)
145. *P. schultesii* Guzmán & S.H. Pollock
146. *P. 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. *obtusata* 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. uxpapanapensis* 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. yungenses* 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.



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).

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* Guzmán-Dávalos & Guzmán
189. *G. validipes* (Peck) Hesler
190. *G. viridans* Murrill
191. *Inocybe aeruginascens* Babos (Fig. 37)
192. *I. coelestium* Kuyper
193. *I. corydalina* Quél. var. *corydalina*
194. *I. corydalina* var. *erinaceomorpha* (Stangl & J. Veselsk) Kuyper
195. *I. haemacta* (Berk. & Cooke) Sacc. (Fig. 38)
196. *I. tricolor* Kühner



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).

Boletaceae

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

Russulaceae

205. *Russula agglutinata* R. Heim
206. *R. kirinea* R. Heim
207. *R. maenadum* R. Heim
208. *R. nondorbingi* Singer
209. *R. pseudomaenadum* R. Heim
210. *R. wahgiensis* Singer

Lycoperdales

211. *Lycoperdon candidum* Pers. (= *L. marginatum* Vittad.)
212. *L. oblongiosporum* Berk. & M.A. Curtis
213. *Vascellum pratense* (Pers. emend. Quél.) Kreisell
214. *V. intermedium* A.H. Sm. (= *Lycoperdon cruciatum* s. auct. non s. Rostk.; *Vascellum cruciatum* s. Ponce de León)
215. *V. qudenii* (Bottomley) P. Ponce de León (= *Lycoperdon mixtecorum* R. Heim)

Phallales

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

TABLE II. DISTRIBUTION OF THE SPECIES ⁽³⁾

NORTH AMERICA

ALASKA

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

⁽³⁾ 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.

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.*, 1958b)
Conocybe smithii (Ammirati *et al.*, 1985)
Gymnopilus aeruginosus (Ammirati *et al.*, 1985)
G. sapineus (Hesler, 1969)
Panaeolina foenisecii (Groves, 1962; Singer, 1978)
Panaeolus castaneifolius (Ola'h, 1969)
P. sphinctrinus (Groves, 1962)
P. subbalteatus (Singer *et al.*, 1958; Ammirati, 1985)
Psilocybe quebecensis (Singer, 1978; Chilton, 1978)
P. semilanceata (Heim *et al.*, 1966a; Heim, 1971; Dawson & Morelli, 1978; Ott, 1978; Kinghorn, 1979; Samorini, 1992)

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.*, 1977a; Stamets, 1978, 1996)
Gymnopilus luteofolius (Stamets, 1996)
Panaeolus papilionaceus (Gerhardt, 1996)
P. subbalteatus (Ammirati *et al.*, 1985)
Psilocybe baecystis (Singer & Smith, 1958; Guzmán *et al.*, 1976; Repke *et al.*, 1977a; Stamets, 1978; Guzmán, 1983)
P. cyanofibrillosa (Stamets, 1996)
P. cyanescens (Repke *et al.*, 1977a; 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.*, 1977a; Hatfield, 1979; Lincoff, 1981; Guzmán, 1983; Ammirati *et al.*, 1985)
P. semilanceata (Heim *et al.*, 1966a; Ola'h, 1967; Guzmán *et al.*, 1976; Ott, 1976b; Repke *et al.*, 1977a; Stamets, 1978, 1996; Hatfield, 1979; Guzmán, 1983; Ammirati *et al.*, 1985; Arora, 1986; Redhead, 1989; Turner & Szczawinski, 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.*, 1977a; 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, 1988)

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

G. viridans (Hatfield *et al.*, 1978; Ammirati *et al.*, 1985)

Panaeolina foenicicii (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 foenicicii (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; Kinghorn, 1979; Miller, 1979; Lincoff, 1981; Ammirati *et al.*, 1985, Northern States; Phillips, 1991; Samorini, 1992)
- Boletus nigroviolaceus* (Corner, 1972)
- Claviceps paspali* (Grasso, 1955; Abou-Chaar *et al.*, 1961; Mantle, 1977; Heim, 1978; 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* (Chilton, 1978; Heim, 1978; Ott, 1978; Schultes & Hofmann, 1979; Ammirati *et al.*, 1985; Singer, 1986, page 548)
- C. smithii* (Ott, 1978; Lincoff, 1981, northwestern; 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 *et al.*, 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; Kinghorn, 1979; Lincoff, 1981; Dickinson & Lucas, 1983; Ammirati *et al.*, 1985; Arora, 1986; Bresinsky & Besl, 1990; Samorini, 1992; Bessette *et al.*, 1997)
- G. validipes* (Hatfield *et al.*, 1977; Arora, 1986; Stamets, 1996; Bessette *et al.*, 1997)
- Hypholoma popperianum* (Singer, 1978)
- Inocybe aeruginascens* (Stamets, 1996)
- I. corydalina* (Stamets, 1996)
- Panaeolina foenicicii* (Hongo, 1959; Ola'h, 1969, 1970; Robbers *et al.*, 1969; Fiussello & 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; 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; Heim, 1978; Stamets, 1978, 1996; Ammirati *et al.*, 1985; Treu, 1996)

- P. subbalteatus* (Smith, 1948; Singer *et al.*, 1958b; 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 atricapilus* (Miller, 1979; Lincoff, 1981; Phillips, 1991)
- P. salicinus* (Singer, 1956; Hongo, 1959; Ammirati *et al.*, 1985; Stamets, 1996)
- Psilocybe baeocystis* (Chilton, 1978; Ott & Bigwood, 1978; Singer, 1978; Lincoff, 1981, north-western; Bessette *et al.*, 1997)
- P. caerulescens* (Singer, 1978)
- P. caerulipes* (Bessette *et al.*, 1997; Singer, 1978)
- P. cubensis* (Duffy & Vergeer, 1977; Ott & Bigwood, 1978; Hatfield, 1979 & Kinghorn, 1979, both in Gulf Coast States; Saupe, 1981; Lincoff, 1981, Gulf Coast States; McKenna, 1990; Stamets, 1996, southeastern States; Miller, 1979)
- P. cyanescens* (Chilton, 1978; Ott & Bigwood, 1978)
- P. pelliculosa* (Tyler, 1961, Pacific Northwest; Singer, 1978; Chilton, 1978; Kinghorn, 1979)
- P. plutonia* ? (Smith, 1948)
- P. semilanceata* (Repke & Leslie, 1977, Pacific Northwest; Kinghorn, 1979; Dickinson & Lucas, 1983; Stijve, 1984, Pacific Northwest; Ammirati *et al.*, 1985; Phillips, 1991; Samorini, 1992; Gartz, 1996)
- P. silvatica* (Singer, 1978; Lincoff, 1981)
- P. strictipes* (Singer, 1978; Chilton, 1978; Lincoff, 1981)
- P. stunzii* (Singer, 1978; Chilton, 1978)

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, 1978; Duffy & Vergeer, 1977; Jenkins, 1977, 1986; McDonald, 1978; 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. liquiritiae* (Hesler, 1969)
- G. luteofolius* (Stamets, 1996)
- G. sapineus* (Hesler, 1969)
- G. spectabilis* (Hesler, 1969; Duffy & Vergeer, 1977; Ott, 1976b; Stamets, 1996)
- Hyppholoma popperiana* (Singer, 1973, 1986; Stamets, 1978; Guzmán, 1999b)
- Panaeolina foenicicii* (Duffy & Vergeer, 1977; Allen & Merlin, 1992c)
- Panaeolus fimicola* (Gerhardt, 1996)

P. papilionaceus (Guzmán *et al.*, 1976; Gerhardt, 1996)
P. retirugis (Duffy & Vergeer, 1977)
Psilocybe azureascens (Stamets, 1996)
P. baeocystis (Guzmán *et al.*, 1976; Repke *et al.*, 1977a; Duffy & Vergeer, 1977)
P. cyanescens (Guzmán *et al.*, 1976; Duffy & Vergeer, 1977; Repke *et al.*, 1977a; 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; Turner & 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; Hatfield, 1979; 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, 1958b; 1978; Heim & Hofmann, 1958; Singer & Smith, 1958; Ott, 1976b, 1978; 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. liquiritiae (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 & Bonnard, 1986; Gartz, 1987c,
1996; Ohenoja *et al.*, 1987)

Indiana

Amanita muscaria (Jenkins, 1986)
A. pantherina (Jenkins, 1986)
Panaeolina foenicicii (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, 1978)

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.*, 1977a)

Massachusetts

Amanita muscaria (Jenkins, 1977)
Gymnopilus sapineus (Hesler, 1969)
G. spectabilis (Hesler, 1969; Pollock, 1976; Gartz, 1996)
Panaeolina foenicicii (Singer, 1969; Allen & Merlin, 1992c; Gerhardt, 1996)

Panaeolus papilionaceus (Gerhardt, 1996)

P. subbalteatus (Singer *et al.*, 1958b)

Michigan

Amanita muscaria (Jenkins, 1977, 1986)

A. pantherina (Jenkins, 1977, 1986)

Conocybe smithii (Benedict *et al.*, 1962b; 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 (Heim, 1965b)

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.*, 1962b; 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 *et al.*, 1985)
Panaeolina foeniscessi (Gerhardt, 1996)
Panaeolus castanaefolius (Ola'h, 1969)
P. fimicola (Gerhardt, 1996)
P. papilionaceus (Gerhardt, 1996; Gartz, 1996)
P. subbalteatus (Levine, 1917; Singer *et al.*, 1958b; Heim, 1978)
P. retirugis (Levine, 1917)
Psilocybe caerulipes (Singer & Smith, 1958; Leung *et al.*, 1965; Benedict *et al.*, 1967, Guzmán, 1983)
P. semilanceata (Ott, 1978; 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 foeniseccii (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)
A. pantherina (Furst, 1992)

A. muscaria (Ott, 1978; Hobbs, 1995)
Conocybe cyanopus (Chilton, 1978; Stamets, 1996; Allen, 1997b)
C. smithii (Repke *et al.*, 1977a; Stamets, 1996)
Gymnopilus aeruginosus (Stamets, 1996)
G. spectabilis (Hesler, 1969; Guzmán-Dávalos & Guzmán, 1995)
G. liquiritiae (Hesler, 1969)
G. sapineus (Hesler, 1969)
G. luteofolius (Hesler, 1969)
G. viridans (Ammirati *et al.*, 1985)
Panaeolina foenisecii (Guzmán *et al.*, 1976)
Panaeolina castaneifolius (Ola'ñ, 1968; Guzmán *et al.*, 1976; Stamets, 1996)
P. sphinctrinus (Guzmán *et al.*, 1976)
P. subbalteatus (Singer, 1960a; Ott & Guzmán, 1976; Guzmán *et al.*, 1976; Repke *et al.*, 1977a)
Psilocybe azureus (Stamets & Gartz, 1995; Stamets, 1996)
P. baeocystis (Singer & Smith, 1958; Guzmán *et al.*, 1976; Benedict *et al.*, 1962a; Leung *et al.*, 1965; Repke *et al.*, 1977a; Stamets, 1978, 1996; Chilton, 1978; Beug & Bigwood, 1981, 1982; Guzmán, 1983; Allen, 1997b)
P. cyanofibrillosa (Stamets, 1996)
P. cyanescens (Benedict *et al.*, 1962b; Repke *et al.*, 1977a; Stamets, 1978; Chilton, 1978; Lincoff, 1981; Guzmán, 1983, 1999a; Arora, 1986)
P. fimetaria (Stamets, 1996)
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.*, 1977a; 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, 1978; Repke & Leslie, 1977; Repke *et al.*, 1977; Ott & Bigwood, 1978; Stamets, 1978; Hatfield, 1979; Kinghorn, 1979; Christiansen *et al.*, 1981; Christiansen & Rasmussen, 1982; Guzmán, 1983; Stijve & Kuyper, 1985; Gartz, 1986c, 1989e, 1991a; Semerdzieva *et al.*, 1986; Turner & Szczawinski, 1991; Furst, 1992)
P. sierrae (Guzmán, 1983; Stamets, 1996)
P. silvatica (Singer & Smith, 1958; Repke *et al.*, 1977a; Guzmán, 1983)
P. strictipes (Singer & Smith, 1958; Chilton, 1978; Stamets, 1978, 1996; Guzmán, 1983, 1995; Ammirati *et al.*, 1985)
P. stuntzii (Guzmán & Ott, 1976; Repke *et al.*, 1977a; Ott & Bigwood, 1978; Chilton, 1978; Stamets, 1978, 1996; Beug & Bigwood, 1981, 1982; Lincoff, 1981; Guzmán, 1983; Furst, 1992)

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. liquiritiae (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, 1978; Repke *et al.*, 1977a; Guzmán, 1983; Gartz, 1987b; 1989d; Metzler *et al.*, 1992)

Vermont

Amanita muscaria (Heim, 1965b; Jenkins, 1986)
A. pantherina (Jenkins, 1986)
Gymnopilus spectabilis (Hesler, 1969)
G. liquiritiae (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.*, 1962b, 1967; Miller & Tatelman, 1977; Repke *et al.*, 1977a; Chilton, 1978; Stamets, 1978, 1996; Ammirati *et al.*, 1985; Gartz, 1996; Allen, 1997b)
C. smithii (Guzmán *et al.*, 1976; Repke *et al.*, 1977a; Stamets, 1978, 1996)
Gymnopilus aeruginosus (Stuntz & Isaacs, 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 & Isaacs, 1962; Guzmán *et al.*, 1976; Ott, 1976b; Repke *et al.*, 1977a; Stijve, 1995; Gartz, 1996; Allen, 1997b)
Psilocybe baeocystis (Singer & Smith, 1958; Leung *et al.*, 1965; Repke *et al.*, 1977a; 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.*, 1962b; Guzmán *et al.*, 1976; Repke *et al.*, 1977a; 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.*, 1977a; Ott & Bigwood, 1978; Stamets, 1978, 1996; Chilton, 1978; Hatfield, 1979; Lincoff, 1981; Beug & Bigwood, 1982; Guzmán, 1983)
P. semilanceata (Hofmann *et al.*, 1963; Guzmán *et al.*, 1976; Repke & Leslie, 1977; Repke *et al.*, 1977a; Ott, 1978; Stamets, 1978, 1996; Hatfield, 1979; Kinghorn, 1979; Christiansen *et al.*, 1981; Lincoff, 1981; Christiansen & Rasmussen, 1982; Guzmán, 1983; Stijve & Kuyper, 1985; Gartz, 1986c; Semerdzieva *et al.*, 1986; Turner & Szczawinski, 1991; Furst, 1992)
P. silvatica (Singer & Smith, 1958; Repke *et al.*, 1977a; Guzmán, 1983)
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.*, 1977a; Chilton, 1978; Ott & Bigwood, 1978; Stamets, 1978, 1996; Lincoff, 1981; Beug & Bigwood, 1981, 1982; Guzmán, 1983; Furst, 1992; Gartz, 1996)

West Virginia

Amanita muscaria (Tulloss *et al.*, 1995)
A. pantherina (Tulloss *et al.*, 1995)

Wisconsin

Psilocybe azurescens (Stamets, 1996)

Wyoming

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

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Amanita muscaria (Guzmán, 1959, 1977a, 1997; Heim, 1965b; Lowy, 1972, 1974; Ott, 1976b, 1978, 1993; Cooke, 1977; Jenkins, 1977; Heim, 1978; Singer, 1978; Schultes & Hofmann, 1979; Welden & Guzmán, 1978; Navet, 1988; Wasson *et al.*, 1986; Herrera & Ulloa, 1990; Furst, 1992; Nyberg, 1992; Hawksworth *et al.*, 1995; 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.*, 1958b; Singer, 1959, 1960a; Guzmán, 1959, 1975b, 1977a, 1997; Guzmán & Pérez-Patracca, 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-Patracca, 1972; Pollock, 1976; Schultes & Hofmann, 1979; Guzmán *et al.*, 1988)
- Cordyceps capitata* (Heim, 1957c; Heim & Wasson, 1958; Singer, 1958, 1959; Guzmán, 1959, 1977a, 1997; Schultes & Hofmann, 1973, 1979; Heim, 1978; Lincoff, 1981; 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, 1990a, 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)
- G. subpurpuratus* (Guzmán-Dávalos & Guzmán, 1991, 1995)
- 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 foenicicii* (Guzmán & Pérez Patracca, 1972; Guzmán, 1977a; Singer, 1978; Allen & Merlin, 1992c)
- Panaeolus fimicola* (Heim, 1956a, 1957a; Guzmán & Pérez-Patracca, 1972; Guzmán, 1990a; Gerhardt, 1996)
- P. papilionaceus* (Herrera & Ulloa, 1990)
- P. retirugis* (Guzmán & Pérez-Patracca, 1972; Bandala *et al.*, 1988)
- P. sphinctrinus* (Schultes, 1939, 1976; Singer, 1949, 1959, 1960a, 1969, 1978; Ramsbottom, 1954; Heim, 1957a, 1958b, 1978; Singer & Smith, 1958; Singer *et al.*, 1958; Ola'h, 1969, 1970; Guzmán & Pérez-Patracca, 1972; Schultes & Hofmann, 1973, 1979; Guzmán, 1975b, 1977a, 1997, 1990a; Ott, 1976b; Ott & Bigwood, 1978; Herrera & Ulloa, 1990)
- P. subbalteatus* (Guzmán & Pérez-Patracca, 1972; Ott & Guzmán, 1976; Ott, 1976b; Guzmán, 1977a; Singer, 1978; 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)
- Pluteus atricapillus* (Guzmán, 1975b, 1977a, Welden & Guzmán, 1978)
- Psilocybe angustipleurocystidiata* (Guzmán, 1983, 1990a, 1995, 1997; Guzmán *et al.*, 1988)
- P. armandii* (Guzmán & Pollock, 1979; Guzmán, 1983; Guzmán *et al.*, 1988)
- P. aztecorum* var. *aztecorum* (Wasson, 1957, see note in Wasson & Wasson, 1958; Heim, 1957a, c; Heim & Hofmann, 1958; Heim & Wasson, 1958; Singer, 1958, 1959, 1978; Singer *et al.*, 1958b; Singer & Smith, 1958; Guzmán, 1959, 1975b, 1977a, 1983, 1990a, 1997, 1998b; 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; Singer, 1978)
- P. banderillensis* (Welden & Guzmán, 1978; Guzmán, 1983; Guzmán *et al.*, 1988)
- P. barrerae* (Cifuentes & Guzmán, 1981; 1982; Guzmán *et al.*, 1988; Guzmán, 1990a, 1995, 1997; 1999a; Guzmán *et al.*, 1999)
- P. caerulescens* var. *caerulescens* (Heim, 1957a, c, 1958b, 1978; Wasson, 1957, see note in Wasson & Wasson, 1957; Heim & Cailleux, 1957, 1958; Heim & Hofmann, 1958; Heim & Wasson, 1958; Singer & Smith, 1958; Singer, 1958, 1959, 1978; 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; 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, 1978; Heim & Wasson, 1958, 1965; Schultes & Hofmann, 1973; Ott & Bigwood, 1978; Singer, 1978; Guzmán, 1983, 1997)
- P. caerulipes* (Guzmán, 1977a, 1983; Stamets, 1996)
- P. chiapanensis* (Guzmán, 1995)
- P. cordispora* (Heim, 1957a, 1978; Heim & Wasson, 1958; Guzmán, 1959, 1977a, 1983, 1997; Schultes & Hofmann, 1973; Welden & Guzmán, 1978; Ott & Bigwood, 1978; Herrera & Ulloa, 1990; Lipp, 1990, 1991; Ott, 1993)
- P. cubensis* (Singer, 1949, 1959, 1978; Heim, 1956a, b, 1957a, 1958a, b, 1978; Wasson, 1957, see in Wasson & Wasson, 1957; Heim & Cailleux, 1957; Heim & Hofmann, 1958; Heim & Wasson, 1958; Singer, 1958; Singer & Smith, 1958; Singer *et al.*, 1958; Guzmán, 1959, 1975b, 1977a, 1982, 1983, 1990a, 1995, 1997; Chávez de la Mora, 1961; Schultes & Hofmann, 1973, 1979; Rubel & Gettelfinger-Krejci, 1976; Schultes, 1976; Ott, 1976b, 1978, 1993; Repke *et al.*, 1977b; Welden & Guzmán, 1978; Chilton, 1978; Ott & Bigwood, 1978; Gartz, 1987b, 1989, 1996; Bauer, 1992; Stijve & de Meijer, 1993; Riedlinger, 1990, a color plate; Herrera & Ulloa, 1990; Hobbs, 1995; Stamets, 1996)
- P. fagicola* var. *fagicola* (Heim & Wasson, 1958, 1965; 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)
- 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 & Gettelfinger-Krejci, 1976; Schultes, 1976; Heim, 1978; Singer, 1978; Welden & Guzmán, 1978; Lipp, 1990, 1991; Stamets, 1996)
- P. hoogshagenii* var. *convexa* (Heim & Cailleux, 1958; Heim & Hofmann, 1958; Heim & Wasson, 1958; Heim, 1958b, 1978; Schultes, 1976; Chilton, 1978; Ott & Bigwood, 1978; Schultes & Hofmann, 1979; Guzmán, 1983)
- P. isabellae* Guzmán *et al.*, 1999)
- P. jacobsii* (Guzmán, 1983)
- P. jaliscana* (Guzmán, 1999a)
- P. laurae* (Guzmán, 1998a)
- P. mammilata* (Guzmán & Pollock, 1979; Guzmán, 1983; Stamets, 1996)
- P. mexicana* (Heim, 1956a, 1957a, c, 1958b, 1978; Heim & Cailleux, 1957; Wasson, 1957, see Wasson & Wasson, 1957; Singer, 1958, 1959, 1978; Singer & Smith, 1958; Singer *et al.*, 1958; Heim & Hofmann, 1958; Heim & Wasson, 1958; Hofmann *et al.*, 1958; Weidemann *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; Hawksworth *et al.*, 1995; Stamets, 1996; Gartz, 1996)

P. moseri (Guzmán, 1995)

P. muliercula (Wasson, 1957, see note in Wasson & Wasson, 1957; Heim, 1957a, c, 1978; Heim & Wasson, 1958; Singer, 1958, 1959, 1978; Singer *et al.*, 1958; Schultes & Hofmann, 1973, 1979; Guzmán, 1975b, 1977a, 1983, 1990a, 1997; Schultes, 1976; Ott, 1976b, 1990, 1993; Ott & Bigwood, 1978; Chilton, 1978; Brown, 1990; Demarest, 1990; Herrera & Ulloa, 1990; Stamets, 1996)

P. pleurocystidiosa (Guzmán, 1983; Guzmán *et al.*, 1988)

P. rzedowskii (Welden & Guzmán, 1978; Guzmán, 1983; Guzmán *et al.*, 1988)

P. sanctorum (Guzmán, 1982, 1990a, 1995; Guzmán *et al.*, 1988)

P. schultesii (Guzmán & Pollock, 1979; 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, 1998b; Guzmán *et al.*, 1988)

P. veraecrucis (Welden & Guzmán, 1978; Guzmán & Pollock, 1979; Guzmán, 1983; Guzmán *et al.*, 1988)

P. villarrealii (Guzmán, 1998a)

P. wassoniorum (Guzmán & Pollock, 1979; Guzman, 1983; Guzmán *et al.*, 1988; Ott, 1993; Brown, 1990; Demarest, 1990; 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, 1978; Schultes & Hofmann, 1973; Guzmán, 1975b, 1977a, 1983, 1997; Schultes, 1976; Ott, 1976b, 1993; Cooke, 1977; Heim, 1978; Welden & Guzmán, 1978; Ott & Bigwood, 1978; Herrera & Ulloa, 1990; Lipp, 1990, 1991; Stamets, 1996)

P. zapotecorum (Wasson, 1957, see Wasson & Wasson, 1957; Heim & Cailleux, 1957; Heim, 1958a, 1978; Singer & Smith, 1958; Singer *et al.*, 1958; Heim & Hofmann, 1958; Heim & Wasson, 1958; Singer, 1958, 1959, 1978; Heim *et al.*, 1967; Guzmán, 1975b, 1977a, 1983, 1990a, 1997; Ott, 1976b, 1993; Ott & Guzmán, 1976; Schultes, 1976; Ott & Bigwood, 1978; Welden & Guzmán, 1978; Singer, 1978; Riedlinger, 1990, a color plate; Herrera & Ulloa, 1990; Stamets, 1996; Gartz, 1996)

Vascellum intermedium (Heim *et al.*, 1967; Schultes & Hofmann, 1973, 1979; Ott *et al.*, 1975; Hawksworth *et al.*, 1975; Hawksworth *et al.*, 1995)

V. pratense (Heim *et al.*, 1967; Schultes & Hofmann, 1973, 1979; Ott *et al.*, 1975; Guzmán, 1977a, 1997; Heim, 1978; Hawksworth *et al.*, 1995)

V. qudenii (Heim *et al.*, 1967; Schultes & Hofmann, 1973, 1979; Ott *et al.*, 1975; Guzmán, 1977a, 1997; Heim, 1978; Hawksworth *et al.*, 1995)

CENTRAL AMERICA

British Honduras (Belize)

Copelandia cyanescens (Gerhardt, 1996)

Psilocybe cordispora (Reid, 1970)
P. cubensis (Heim, 1956b, 1978; Singer & Smith, 1958)

Costa Rica

Amanita muscaria (Sáenz *et al.*, 1983)
Claviceps paspali (Grasso, 1959)
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; Cooke, 1977; Singer, 1978; Torres, 1984; Wasson *et al.*, 1986; Nyberg, 1992; Samorini, 1992; Ott, 1993; Hawksworth *et al.*, 1995; Wasson, 1995; Guzmán, 1997)
Psilocybe caerulescens (Singer, 1978)
P. 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, 1978; Singer & Smith, 1958; 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, 1978; Singer & Smith, 1958; Navarro & Betancourt, 1992; Guzmán *et al.*, 1997b)
P. guilartensis (Guzmán *et al.*, 1997b)
P. portoricensis (Guzmán *et al.*, 1997b)
P. subcubensis (Navarro & Betancourt, 1992; Guzmán, 1995; Guzmán *et al.*, 1997b)

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 foenicicii (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.*, 1958b)
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*; Singer, 1978; Guzmán, 1983; Stamets, 1996)

Bolivia

Claviceps paspali (Grasso, 1955)
Copelandia anomala (Pollock, 1976)
C. cyanescens (Singer, 1960a; 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; Singer, 1978; Guzmán, 1983; Ott, 1993; Stamets, 1996)

Brazil

Amanita muscaria (Homrich, 1965; Stijve, 1995; Stijve & de 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 foenicicii (Rick, 1961; Stijve & de Meijer, 1993)
Panaeolus fimicola (Rick, 1961)
P. papilionaceus (Rick, 1961; Pegler, 1997)
P. sphinctrinus (Ola'h, 1969)

P. subbalteatus (Ola'h, 1969; Stijve & Meijer, 1993; Stamets, 1996)
Pluteus glaucus (Stijve, 1995; Stijve & Meijer, 1993)
Psilocybe acutipileae (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 & de Meijer, 1993; Pegler, 1997)
P. caerulescens var. *caerulescens* (Stijve & de Meijer, 1993; Stamets, 1996)
P. cubensis (Rick, 1961; Guzmán, 1983; Stijve & de Meijer, 1993; Gartz, 1996; Pegler, 1997)
P. farinacea (Guzmán, 1983, 1995; Singer, 1986)
P. furtadoana (Guzmán, 1983; Pegler, 1997)
P. hoogshagenii var. *hoogshagenii* (Stijve & de 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 & de Meijer, 1993; Pegler, 1997)
P. cf. subyungensis (Stijve & de Meijer, 1993)
P. uruguayensis (Stijve & de Meijer, 1993)
P. zapotecorum (Guzmán, 1983; Stijve & de 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 & Lindequest, 1988; Gartz & Muller, 1990; Gartz, 1991a, b, c, 1996)
G. spectabilis (Singer, 1969; Garrido, 1985; Valenzuela *et al.*, 1992)
Panaeolina foenicicii (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, 1992; 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 & de 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)
Panaeolus papilionaceus (Gerhardt, 1996)
P. sphinctrinus (Pollock, 1976; Pulido, 1983)
Psilocybe angustipleurocystidiata (Guzmán, 1983)
P. antioquensis (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.*, 1989, 1998)
P. yungensis (Guzmán, 1983; Ott, 1993; Stamets, 1996)
P. zapotecorum (Guzmán, 1983; Pulido, 1983; Stijve & de 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.*, 1977a; Gartz, 1996)
P. yungensis ? (Gartz, 1996)
P. zapotecorum (Guzmán, 1983; Stamets, 1996)

Uruguay

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

Venezuela

Claviceps paspali (Grasso, 1955; Dennis, 1970)
C. purpurea (Grasso, 1955; Dennis, 1970)
Copelandia cyanescens (Gerhardt, 1996)
Gerronema fibula (Dennis, 1970)
Gymnopilus laleritius (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. pseudobullacea (Marcano *et al.*, 1994)
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; Hawksworth *et al.*, 1995)
- A. pantherina* (Heim, 1957b, 1958a, b, 1978; Hongo, 1959; Kinghorn, 1979; Phillips, 1981; Moser, 1983; Bon, 1987a; Bresinsky & Besl, 1990; Samorini, 1992)
- A. regalis* (Moser, 1983; Jenkins, 1986; Bresinsky & Besl, 1990; Kell, 1991; Stijve, 1995)
- Claviceps nigricans* (Ramsbottom, 1954; Schultes, 1976; Heim, 1978; Singer, 1978; Wasson *et al.*, 1978)
- C. paspali* (Mantle, 1977; Singer, 1978; Wasson *et al.*, 1978; Hawksworth *et al.*, 1995)
- 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; Hawksworth *et al.*, 1995)
- 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.*, 1967; 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)
- Inocybe aeruginascens* (Stijve *et al.*, 1985; Singer, 1986, page 601; Bresinsky & Besl, 1990; Samorini, 1992)
- 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, page 601; Bon, 1987a; Bresinsky & Besl, 1990)
- I. corydalina* var. *erinaceomorpha* (Stijve *et al.*, 1985; Gurevich, 1993)
- 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 foenicicij* (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. pabillonaceus (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; Dickison & 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 bohémica (Gurevich, 1993)
P. coprinifacies (Pegler & Legon, 1998)
P. cyanescens (Kühner & Romagnesi, 1953; Kühner, 1980; Margot & Watling, 1981; Phillips, 1981; Moser, 1983; Bresinsky & Besl, 1990; Gartz, 1996)
P. fimetaria (Singer, 1978)
P. liniformans var. *liniformans* (Bresinsky & Besl, 1990; Pegler & Legon, 1998)
P. mairei (Singer, 1978; Pegler & Legon, 1998)
P. semilanceata (Kühner & Romagnesi, 1953; Heim, 1957b; Cooke, 1977; Ott & Bigwood, 1978; Singer, 1978; Kühner, 1980; Phillips, 1981; Margot & Watling, 1981; Moser, 1983; Dickinson & Lucas, 1983; Bon, 1987a; Bresinsky & Besl, 1990; Turner & Szczawinski, 1991; Furst, 1992; Stijve, 1995; Stamets, 1996; Gartz, 1996)
P. serbica (Singer, 1978; 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; Heim, 1978)
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 foenicicii (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 foenicicii (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 foenicicii (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; Chilton, 1978; 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 (Guzmán, 1983, 1995; Sebeck, 1985; Stamets, 1996)
P. strictipes (Guzmán, 1983, 1995; Sebek, 1985; Stamets, 1996)

Denmark

Claviceps paspali (Grasso, 1955; Heim, 1978)
C. purpurea (Grasso, 1955; Heim, 1978)
Inocybe haemacta (Kuyper, 1986)

Panaeolina foeniseeii (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)

Faeroes Islands

Panaeolus moellerianus (Möller, 1945; Singer, 1960a)
Psilocybe semilanceata (Möller, 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, 1965b; Locquin-Linard, 1965, 1966a, b, 1967; Schultes & Hofmann, 1979; Dickinson & Lucas, 1979; Samorini, 1992, 1996, 1997; Wasson, 1995)
A. pantherina (Chilton & Ott, 1976; Jenkins, 1977; Samorini, 1996)
Claviceps purpurea (Grasso, 1955; Cooke, 1977; Heim, 1957c, 1978; Hawksworth *et al.*, 1995)
Copelandia anomala (Pollock, 1976)
C. cyanescens (Heim, 1978; Heim *et al.*, 1966b; Pollock, 1976; Chilton, 1978; 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 foeniseeii (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, 1984 & 1987)
C. ophioglossoides Derbsch & Schmitt, 1984 & 1987)
Conocybe cyanopus (Gartz, 1996; Stamets, 1996)
Galerina steglichii (Besl, 1994; Gartz, 1995a, 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 liquiritiae (Derbsch & Schmitt, 1984 & 1987)
G. purpuratus (Kreisel & Lindequest, 1988; Gartz & Müller, 1990; Gurevich, 1993; 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, 1989a, 1995b, 1996; Gartz & Drewitz, 1985, 1986; Stijve *et al.*, 1985; Stijve & Kuyper, 1985; Semerdzieva *et al.*, 1986; Kuyper, 1986; Gurevich, 1993)
I. coelestium (Stijve & Kuyper, 1985; Stijve *et al.*, 1985; Kuyper, 1986; Stamets, 1996)
I. corydalina var. *corydalina* (Derbsch & Schmitt, 1984 & 1987; Kuyper, 1986)
I. corydalina var. *erinaceomorpha* (Stijve & Kuyper, 1985; Stijve *et al.*, 1985; Kuyper, 1986)
I. haemacta (Derbsch & Schmitt, 1984 & 1987; Kuyper, 1986; Gartz, 1986a)
Panaeolina foenicicii (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; Gurevich, 1993; Gartz, 1996)
P. villosus (Derbsch & Schmitt, 1984 & 1987)
Psilocybe azureascens (Stamets, 1996)
P. bohemica (Stamets, 1996)
P. cyanescens (Bresinsky & Haas, 1976; Gartz, 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; Oldridge *et al.*, 1989; McKenna, 1990; Ott, 1993; Wasson, 1995)
- A. pantherina* (Pegler, 1965; Wakefield & Dennis, 1981; Oldridge *et al.*, 1989)
- Claviceps nigricans* (Dennis, 1968)
- C. purpurea* (Ramsbottom, 1954; Grasso, 1955; Dennis, 1968; Cooke, 1977)
- Conocybe kuehneriana* (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; Oldridge *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 foenisecii* (Ola'h, 1969; Singer, 1969; Robbers *et al.*, 1969; Fiussello & Scurti, 1972; Watling, 1979; Wakefield & Dennis, 1981; Stijve *et al.*, 1984; Gartz, 1985c; Dennis, 1986; Ohenoja *et al.*, 1987; Watling & Gregory, 1987; Oldridge *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; Oldridge *et al.*, 1989)
- P. subbalteatus* (Watling, 1977; Dennis, 1986; Watling & Gregory, 1987; Oldridge *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.*, 1962b; Heim *et al.*, 1967; Chilton, 1978; Ott, 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, 1992; 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 foeniseeii (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-Beukers, 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 foeniseeii (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; 1992, 1996)
A. pantherina (Samorini, 1989, 1992)
Claviceps paspali (Grasso, 1955; Ott, 1993)
C. purpurea (Grasso, 1949, 1955; Samorini, 1991)
Copelandia anomala (Pollock, 1976)
C. cyanescens (Pollock, 1976; Chilton, 1978; Festi, 1985; Samorini, 1989, 1992)

Gerronema fibula (Samorini, 1992)
Gymnopilus liquiritiae (Samorini, 1989)
G. purpuratus (Samorini, 1989)
G. spectabilis (Samorini, 1989, 1992)
Inocybe corydalina (Samorini, 1989, 1992)
I. haemacta (Samorini, 1992)
I. tricolor (Samorini, 1989)
Mycena cyanorbiza (Samorini, 1989, 1992)
Panaeolina foenicicii (Gitti *et al.*, 1983; Samorini, 1989, 1992; Bresinsky & Besl, 1990)
Panaeolus ater (Samorini, 1989, 1992)
P. fimicola (Samorini, 1989, 1992)
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, 1992; Cacialli *et al.*, 1995)
P. subbalteatus (Gitti *et al.*, 1983; Festi, 1985; Samorini, 1989, 1992; Cacialli *et al.*, 1995)
Pluteus cyanopus (Samorini, 1989, 1992)
P. salicinus (Samorini, 1989, 1992)
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)

Latvia

Panaeolus sphinctrinus (Gurevich, 1993)

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, 1968; 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 sapineus (Høiland, 1990)
G. spectabilis (Ott, 1993; Høiland, 1990)
Panaeolina foenicicii (Allen & Merlin, 1992c)
Panaeolus papilionaceus (Gerhardt, 1996)
Pluteus salicinus (Christiansen *et al.*, 1984; Gartz, 1996)
Psilocybe fimetaria (Stamets, 1996)
P. semilanceata (Hiland, 1978; Guzmán, 1983; Samorini, 1992; Gurevich, 1993; 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. panthebrina (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, 1978; Benedic *et al.*, 1966; Wasson, 1968, 1979, 1995; Wieland, 1968; Chilton *et al.*, 1974; Schultes, 1976, 1990; Cooke, 1977; Ott, 1978, 1993; Kinghorn, 1979; Schultes & Hofmann, 1979; Dickinson & Lucas, 1983; McKenna, 1990; Furst, 1992; Nyberg, 1992; Samorini, 1993; McKenna, 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 ater (Gurevich, 1993)
P. papilionaceus (Hongo, 1959; Dennis, 1986; Gurevich, 1993; Gerhardt, 1996)
P. sphinctrinus (Dennis, 1986; Gurevich, 1993; 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 foenicicii (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; 1978)
Panaeolina foenicicii (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 & de Meijer, 1993)
I. corydalina (Stijve & de Meijer, 1993)
Mycena cyanorbiza (Favre, 1955)
Panaeolina foenicicii (Favre, 1955; Allen & Merlin, 1992c; Stijve & de 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 (Samorini, 1992; Stijve & de Meijer, 1993; Stijve, 1995; 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. ophioglosoides (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, north of Africa)

Inocybe corydalina (Dennis, 1986, north of Africa)

Panaeolus foenicicii (Hongo, 1959)

Panaeolus africanus (Gartz, 1996)

P. fimicola (Dennis, 1986, North Africa; Ola'h, 1969; Stamets, 1996)

P. microsporus (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)

P. mairei (Singer, 1978, south west)

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 *et al.*, 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)

Dictyophora indusiata (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 (Loveless, 1964; Cooke, 1977)

South Africa

Amanita muscaria (Watt & Breyer-Brandwijk, 1962; Wieland, 1968; Ott, 1993)

A. pantherina (Watt & Breyer-Brandwijk, 1962; Ott, 1993)

Panaeolina foenicicii (Watt & Breyer-Brandwijk, 1962)

Panaeolus papilionaceus (Watt & Breyer-Brandwijk, 1962)

P. retirugis (Watt & Breyer-Brandwijk, 1962)

P. subbalteatus (Watt & Breyer-Brandwijk, 1962)

Pluteus salicinus (Stamets, 1996)

Psilocybe natalensis (Gartz *et al.*, 1995; Gartz, 1996; Stamets, 1996)

P. semilanceata ? (Samorini, 1992)

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 foenicicii (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 foenicicii (Hongo, 1959)

Psilocybe aeruginascens (Singer, 1978, south east)

P. cubensis (Chilton, 1978, south eastern)

P. subaeruginascens (Singer, 1978, south east)

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 (Allen & Gartz, 1997)

Cambodia (Kampuchea)

Copelandia cambodgeniensis (Ola'h, 1969, 1970; Pollock, 1976; Weeks *et al.*, 1979; Allen & Merlin, 1992a, b; Ott, 1993; Stamets, 1996)

C. cyanescens (Heim, 1978)

C. tropicalis (Ola'h, 1969)

Psilocybe cubensis (Heim, 1958b; Heim & Hofmann, 1958; Allen & Merlin, 1992b; Gartz, 1996; Stamets, 1996)

China

Amanita muscaria (Needham, 1974; Heim, 1978)

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)

Himalaya

Amanita muscaria (Wasson, 1968; Singer, 1978)

Hong Kong

Dictyophora indusiata (Griffiths, 1977)
Panaeolina foenicicii (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; 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; Guzmán, 1995)
Inocybe corydalina (Sathe & Sasangam, 1977)
Panaeolina foenicicii (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)

Amanita muscaria (Heim, 1978?)
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, 1968; Samorini, 1992)

Panaeolus papilionaceus (Gerhard, 1996)

Israel

Amanita pantherina (Binyamini, 1975)

Gymnopilus spectabilis (Reichert & Avizobar, 1959; Dennis, 1986)

Inocybe tricolor (Binyamini, 1975)

Panaeolina foenicicii (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; Heim, 1965a, b, 1978; 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; Heim, 1978; 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; Koke *et al.*, 1981; Imazeki & Hongo, 1983, 1987; Imazeki *et al.*, 1988; Stamets, 1996)

G. liquiritiae (Hongo, 1959; Koke *et al.*, 1981; Imazeki & Hongo, 1983, 1987; Imazeki *et al.*, 1988; Guzmán-Dávalos & Guzmán, 1995)

G. spectabilis (Hongo, 1959, 1960; Walters, 1965; Ott, 1976b, 1993; Singer, 1978; Koike *et al.*, 1981; Imazeki & Hongo, 1983, 1987; Yokoyama, 1985; Imazeki *et al.*, 1988; Samorini, 1992; Tanaka *et al.*, 1993; Stijve, 1995; Gartz, 1996)

Panaeolina foenicicii (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, 1986; Pollock, 1976; Yokoyama, 1985; Imazeki & Hongo, 1987; Imazeki *et al.*, 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 & Hongo, 1987; Imazeki *et al.*, 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, 1959, 1960; Singer & Smith, 1958; Matsuda, 1960; Ott, 1978, 1993; Singer, 1978, 1986, page 568; Guzmán, 1983; Imazeki *et al.*, 1988; Gartz, 1996; Stamets, 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 collection by Allen, in 1998, in Kuala Lumpur Region)

Gerronema fibula (Corner, 1994)

Psilocybe cubensis (from a collection by Allen, in 1998, 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; Singer, 1978; Ott, 1993, stated that this species is not neurotropic)

B. kumaesus (Heim & Wasson, 1958, 1965; Heim, 1963, 1965a, 1978; Singer, 1978; Schultes & Hofmann, 1979; Ott, 1993, stated that this species is not neurotropic)

B. manicus (Heim & Wasson, 1958, 1965; Heim, 1963, 1965a, 1978; Corner, 1972; Singer, 1978; Schultes & Hofmann, 1979; Ott, 1993)

B. nigerimus (Heim, 1963, 1978; Heim and Wasson, 1965; Corner, 1972)

B. nigroviolaceus (Heim & Wasson, 1958, 1965; Heim, 1963, 1965a, 1978; Corner, 1972; Hongo, 1973b; Singer, 1978; Schultes & Hofmann, 1979; Ott, 1993, stated that this species is not neurotropic)

B. reayi (Heim & Wasson, 1958, 1965; Heim, 1963, 1978; Corner, 1972; Singer, 1978; 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, 1965a, 1978; Singer, 1978; Schultes & Hofmann, 1979; Ott, 1993 doubts that this species is neurotropic)
H. retispora (Heim & Wasson, 1965; Heim, 1963, 1965a; 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; Singer, 1978; Guzmán, 1983; Ott, 1993)
P. papuana (Guzmán, 1983)
P. pseudobullacea (Guzmán, 1996)
Russula agglutina (Heim & Wasson, 1958; Heim, 1963, 1978; Schultes & Hofmann, 1979; Ott, 1993, wrote that there is no scientific evidence that this is neurotropic)
R. kirinea (Heim & Wasson, 1958; Heim, 1963, 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, 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, 1978; Rumack & Salzman, 1978; Schultes & Hofmann, 1979; Ott, 1993, wrote that there is no scientific evidence that this species is neurotropic)
R. pseudomaenadum (Heim & Wasson, 1958; Heim, 1963, 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, 1960a; 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, 1959b)

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 (Coomaraswamy, 1979; Singer, 1960a, 1969; Heim *et al.*, 1966b; 1967; Pollock, 1976b, 1967; 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. ochreata (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)
Dictyophora indusiata (Heim, 1978)
Psilocybe cubensis (Heim, 1958c, 1978; Heim & Hofmann, 1958; Allen & Merlin, 1992a; Mckenna, 1993; Ott, 1993; Stijve, 1995; Hobbs, 1995; Stamets, 1996; Gartz, 1996)
P. samuiensis (Allen & Merlin, 1992a, b; Gartz *et al.*, 1994; Guzmán *et al.*, 1993a; Gartz, 1996; Stamets, 1996)
P. subcubensis (Guzmán, 1983; Allen & Merlin, 1992a; Ott, 1993; Stijve, 1995)

Tibet

Amanita muscaria (Heim, 1978)

Turkey

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

Viet-Nam

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

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 foeniseeii* (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, 1992; 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 foeniseeii* (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. cubensis* (Allen *et al.*, 1991)
- 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.*, 1966a, 1967; Pollock, 1976; Stamets, 1978; Stijve, 1992, 1995; Stijve & de 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)

Psilocybe cubensis ? (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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